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DISEASES CAUSED BY BACTERIA AND FUNGI.

—. (1935). **Scarlet Fever Outbreak at Denham.**—*Brit. med. J.* March 30th. 685.
—. (1935). **Scarlet Fever in Buckinghamshire.**—*Ibid.* April 6th. 746.
—. (1935). **Classification of Haemolytic Streptococci.**—*Ibid.* June 29th. 1323-1324. [2 refs.]

Early in 1935 an outbreak of scarlet fever occurred at Denham and at Iver, Bucks. In 90 cases the symptoms were sufficiently well defined to justify a diagnosis of scarlet fever, whilst a large number of other cases showed sore throat, vomiting or slight fever. There were two deaths.

The outbreak was found to be due to the consumption of raw milk, the source of infection being traced to a milker on a farm. Pasteurization of all further milk from the dairy concerned immediately arrested the outbreak.

The annotations at hand point out the difficulties caused by the fact that, whilst a substantial proportion of the population harbour haemolytic streptococci, these may be capable of producing scarlet fever or any of a variety of other infections on transference to another host, or may be harmless. It is now possible, by means of the group precipitin test devised by LANCEFIELD [this *Bull.* **4.** 199.], to decide whether the organism carried by a given individual is likely to be dangerous. In the outbreak to which reference is made above, the haemolytic streptococci isolated from the throat of the milker, from the milk and from the throats of about 60 of the scarlet fever patients were found to belong not only to the same group A, that responsible for human infection, but to the same serological type of group A.

—A. W. STABLEFORTH.

WALSTON, H. D. (1935). **The Clotting of Plasma through Staphylococci and their Products.**—*J. Hyg., Camb.* **35.** 549-558. 7 tables, 1 chart. [17 refs.]

Filtrates of cultures of staphylococci contained a principle capable of clotting citrated blood and plasma, which also caused purified fibrinogen to clot. The principle is thermostable and is precipitated by acetic acid, alcohol and ammonium sulphate. It is dialysable through cellophane after alcoholic precipitation. It is distinct from staphylococcal haemolysin and toxin, but it is antigenic. In its mode of action it resembles thrombin, but is distinct since its action is not inhibited by heparin (antithrombin).—E. J. PULLINGER.

GLENNY, A. T., & STEVENS, Muriel F. (1935). **Staphylococcus Toxins and Antitoxins.**—*J. Path. Bact.* **40.** 201-210. 11 tables. [6 refs.]

The authors demonstrated the production of two distinct types of antitoxin following staphylococcal infections. These two antitoxins correspond to two distinct toxins produced by single strains of staphylococcus. They have been named α- and β-toxins. They are distinguishable as follows :–

	α-toxin.	β-toxin.
Sheep R.B.Cs.	Haemolysis in water-bath at 37°C.	Sometimes very slight haemolysis at 37°C. Rapid haemolysis on subsequent cooling.
Rabbit R.B.Cs.	Haemolysis.	No haemolysis.
Intradermal injection into guinea pigs.	Necrosis.	Flush, no necrosis.
Intravenous or intra-peritoneal injection into mice.	Lethal.	Non-lethal.

A method is described for the evaluation of the α- and β-antitoxin content of serum measured against standard toxin, and for the expression of such figures in terms of $\alpha : \beta$ ratio or of units. A relatively high α-antitoxin content of normal horses was found, and investigations suggested that many strains of staphylococci of animal origin produce β-toxin.—E. J. PULLINGER.

NOSENZO, C. (1935). Della vaccinazione anticarbonchiosa all'estremità caudale. Nota preventiva. [**Anti-Anthrax Vaccination at the Tip of the Tail**].—*Nuovo Ercol.* **40.** 268-271.

Experience gained in the Belgian Congo with a glycerinated anthrax vaccine showed that the mortality rate was about 1 per cent., but that 40 per cent. of animals vaccinated subcutaneously suffered from a painful oedematous swelling at the site of inoculation. This was due to the fact that anthrax spores develop rapidly in connective tissue. In order to avoid this, the author vaccinated about 400 animals between two caudal vertebrae. In no case did a severe local reaction develop.—J. A. NICHOLSON.

CAPOBIANCO, P. (1935). Nuova affermazione del " Carbozoo " (metodo Mazzucchi) nella profilassi immunitaria del carbonchio ematico. [**Experience with the " Carbozoo " Anthrax Vaccine**].—*Clin. vet., Milano.* **58.** 223-233. [24 refs.]

During the past three years, the author has vaccinated with " carbozoo " about 1,500 animals including cattle, sheep and goats. The vaccine was given subcutaneously and was usually followed by a slight general reaction and swelling, heat and pain at the site of injection. These symptoms passed off rapidly and caused no injury to pregnant animals. Goats did not show a hypersensitivity to the vaccine although in some cases very large doses were used. The author concludes that annual vaccination with " carbozoo " confers a lasting immunity against anthrax.—J. A. NICHOLSON.

PATOCKA, F. (1934). Experimentální studie o pathogenních moznostech mikrobů podobných bacilu anthraxu. (Bacillus pseudoanthracis a anthracoides). [**Experimental Study on the Pathogenic Possibilities of Micro-Organisms Similar to** *Bacillus anthracis*. (*B. pseudoanthracis* **and** *B. anthracoides*)].—*Ces. akad. v.a.u. Prag.* pp. 40. 1 table. [37 refs.] [4to].

Since the morphological and biological differentiation of *B. anthracis* and *B. pseudoanthracis* (*B. anthracoides*) is very difficult, and many case records show that *B. pseudoanthracis* may cause disease and death, the author undertook an experimental study of its virulence and pathogenic properties in mice, rabbits and guinea pigs. It was found that one hour after subcutaneous inoculation the bacilli appeared in the blood for a period of eight to ten hours and were excreted in the urine. In the cases of fatal infection they could be detected in the blood 24 hours before death. The virulence of the bacilli increased through passage and also when icteric urine had been added. The addition of lactic acid or bilirubin did not show any effect on the virulence of culture.

The *post-mortem* examination of animals which died after subcutaneous inoculation revealed a picture very similar to that of anthrax, oedematous swelling at the point of inoculation, enlargement of the spleen and congestion of all internal organs. When death occurred more than 18 hours after infection, the pathological changes were less pronounced and the similarity to anthrax was less distinct than when it occurred earlier.

Two consecutive inoculations with the culture did not protect the animals either against anthrax or against infection with pseudoanthrax.

In further experiments the author succeeded in decreasing the virulence of *B. anthracis* culture through many passages in the animal body. Guinea pigs inoculated with massive doses of this culture recovered after a short period. Intraperitoneal inoculation caused haemorrhagic peritonitis, which is not common after infection with a fully virulent strain of *B. anthracis*, but is a typical sequel to inoculation with *B. pseudoanthracis*.—E. PRIBYL (BRNO).

SICKMÜLLER, E. (1935). Abkehr und Umkehr in der Tuberkulose. [**Bovine Tuberculosis**].—*Tierärztl. Rdsch.* **41.** 737-743, 753-758 and 769-775. [19 refs.]

This article is a lengthy review of certain aspects of bovine tuberculosis and is unsuitable for abstraction. In discussing immunity to tuberculosis it is considered that resistance is due in part to constitutional factors. Breeders should attempt to eliminate those anatomical or physiological features which predispose to tubercle infection.—E. J. PULLINGER.

MONTGOMERIE, R. F., & ROWLANDS, W. T. (1936). **The Incidence of Tuberculosis in a Cattle Rearing District in North Wales.**—*Vet. Rec.* **16.** 31-38. 6 tables.

PART I.—The authors carried out a survey of an upland rearing district in Wales 344 ft. above sea level and, in this district, except on two farms, they tested all the cattle with tuberculin, by the double intradermal method. Of the 450 cattle tested on 20 farms, 11·8 per cent. reacted, the percentage of reactors in the various age groups being as follows :– of 109 cattle over 3 years old, 23·8 ; of 59 cattle 2 to 3 years old, 10·5 ; of 126 cattle 1 to 2 years old, 4·7 ; of 103 cattle 6 months to 1 year old, 5·8, and of 55 calves 2 to 6 months old, 16·3. In this district some calves are purchased at outside markets, mainly Chester and Wrexham. It is suggested that the high percentage of reactors among calves is due to their being purchased from a dairying district already infected.

A further survey and test in a more typical upland breeding area was carried out after the above test, with the following results :– of 123 cows tested, 13 per cent. reacted; of 63 cattle 1 to 2 years old, 1·6 per cent. reacted, and of 143 calves, 2·8 per cent. reacted. Of the 329 animals of all ages above 2 months tested in this district, 6·4 per cent. reacted, and of these reactors 12 were purchased outside the area. The figure suggests that the incidence of tuberculosis in a typical upland breeding area in North Wales is very low.

PART II.—In a Welsh Black milking herd tested, approximately 30 per cent. of the adult cattle over two years old reacted, but of the calves only 4·7 per cent. reacted. The result of the experiment indicates that more attention should be paid to calf testing for the building up of tuberculosis-free herds.

The authors prefer the use of the synthetic tuberculin to concentrated old tuberculin.—BRENNAN DEVINE.

LAASS, A. (1935). Die Bestimmung des Keimgehaltes des gesunden, nichtträchtigen Genitaltraktus des Schweines, unter besonderer Berücksichtigung der Tuberkulose bei tuberlös erkrankten Tieren. [**Determination of the Bacterial Flora of the Genital Tract of Healthy, Non-Pregnant Swine, with regard to Tuberculosis**].—*Inaug. Diss., Berlin.* pp. 16. 2 tables. [Numerous refs.]

Bacteriological examinations were carried out on the uteri from 250 healthy swine. Bacteria were only found in 24 cases, *Bact. coli* being that most commonly isolated. In 1,207 carcasses of pigs which were examined no tuberculous lesions were found in the genital tract, but in four cases the regional lymphatic glands were affected.—E. J. PULLINGER.

VON OSTERTAG, R. (1936). Grundsätzliches zur Frage der Bekämpfung und der Tilgung der Tuberkulose des Rindes und zur Frage der Ueberleitung des Bekämpfungsverfahrens in das Tilgungsverfahren. [**Control and Eradication of Tuberculosis**].—*Z. Fleisch- u. Milchhyg.* **46.** 121-128 and 145-153. [1 ref.]

This is a thoughtful and comprehensive discussion of possible methods of control and eradication of bovine tuberculosis. As such it is unsuitable for abstraction but, particularly in view of the extensive experience of the author, the original is recommended to those interested in that disease.—E. J. PULLINGER.

I. KARSTEN. (1935). Warum freiw. Tuberkulosebekämpfungsverfahren nach Ostertag ? [**von Ostertag's Method of Voluntary Tuberculosis Control**].—*Dtsch. tierärztl. Wschr.* **43.** 580-586. [10 refs.]

II. HAUPT, H. (1935). Zu Karsten : Warum freiwilliges Tuberkulosetilgungsverfahren nach Ostertag ? [**Comment on von Ostertag's Voluntary Tuberculosis Eradication Scheme**].—*Ibid.* 757-758.

I. The results of the voluntary tuberculosis control scheme in Germany based on the Ostertag method are considered by many as being insufficient and the method too costly. Various alternative measures are advocated, *e.g.* Bang's method, the universal use of tuberculin, and increasing the resistance of cattle by vaccination.

The author personally believes in the gradual building up of tuberculosis-free herds by the use of the tuberculin test, but declares that the majority of farmers would reject such a scheme as impracticable, since it involves the maintenance of two separate herds. He admits that Ostertag's method, as applied at present, cannot secure the eradication of tuberculosis, and that clinical-bacteriological

examination, on which it is based, does not reveal all cases of open tuberculosis. He believes, however, that this method should be retained and should serve as a basis for greater official veterinary control. He shows by statistics that, where Ostertag's method was adopted voluntarily, the losses to farmers from tuberculous cows and the danger to man from the consumption of tuberculous milk were considerably lessened. He recommends that all owners of cattle, especially those engaged in the sale of milk, should support the scheme and that compensation should be paid for slaughtered animals.

On the whole he is not very optimistic about the success of existing tuberculosis control measures in Germany and, as a practical worker, he realizes the difficulties of any scheme which might secure complete eradication.

II. In reply to KARSTEN's accusation that, in connexion with the control of tuberculosis, he refused to recognize the efficacy of the grazing of cattle as a means of maintaining constitutional robustness, Haupt declares that he always admitted the factors that influence the spread of tuberculosis when it was a question of controlling the disease, but that, on the other hand, he insisted on the avoidance of all infection when eradication measures were in use. He warns KARSTEN of the danger of bovine contagious abortion as a result of the latter's suggestion to allow cows out for a few hours daily in the winter, " even on an unenclosed dung heap ".—M. BURKE.

RAUTMANN, H. (1935). Tuberkulose-Infektion des Kalbes und ihre Verhütung. **[The Prevention of Tuberculosis in Calves]**.—*Dtsch. tierärztl. Wschr.* **43.** 613-614. [2 refs.]

For a fuller version of Rautmann's paper, see this *Bull.* **6.** 100.

ANTHONY, D. J. (1935). **The Accredited Herds Scheme as a Possible First Step in the Eradication of Bovine Tuberculosis in Wales.**—*Vet. Rec.* **15.** 1245-1252. [5 refs.]

The author first outlines the requirements from the milk producers' point of view of the Accredited Producers Scheme of the Milk Marketing Board, and then discusses the question of tuberculosis in Wales.

He devotes much space to a survey of the distribution of human tuberculosis in Wales and to evidence indicating the proportion of cases of bovine origin. As an aid to the detection of the tuberculous cow, there is also a plea for the development of a system of notification by meat inspectors of any tuberculous meat condemned by them in local abattoirs.

The author suggests that the Accredited Herds Scheme might be used as a first step towards tuberculosis eradication, by raising the general standard of health of herds and condition of premises to a stage when Wales might be declared a " special area " for the complete eradication of bovine tuberculosis in the dairy herds of the principality.

CARPANO, M. (1934). Sulla tubercolosi dei bufali in Egitto e su alcune experienze di tubercolinizzazione. **[Tuberculosis of Buffaloes in Egypt]**.—*Bull. Minist. Agric. Egypt.* No. 138. pp. 18. 11 figs. on 7 plates, 4 tables, 1 chart.

From observations made at several Egyptian abattoirs, the author considers that tuberculosis is more prevalent amongst buffaloes than is generally believed, especially in lower Egypt where the animals are kept under most unsatisfactory conditions. In the hot, dry climate of upper Egypt and in thinly populated districts, the incidence of the disease is low. Statistics collected at the Cairo abattoir show that 60 per cent. of the older buffaloes and 9 per cent. of the calves

slaughtered there suffer from tuberculosis. The pulmonary form of the disease predominates.

Before measures could be adopted to control the disease, it was necessary to study the reaction produced in buffaloes by tuberculin. A herd of 350 apparently healthy animals was, therefore, tested by the intradermal and subcutaneous methods. Fifty-one reacted to the intradermal test, but only 11 of these reactors gave positive reactions when subsequently tested by the subcutaneous method. It was found that tuberculin produces a similar type of reaction in buffaloes to that in cattle, except that the subcutaneous injection of tuberculin is often followed by a local reaction and the maximum temperature is not reached until the 30th hour after injection. The author concludes that buffaloes are more sensitive to tuberculin than cattle and he recommends that the subcutaneous test should be used in the field, as non-specific reactions may follow the intradermal injection of tuberculin in buffaloes.—J. A. NICHOLSON.

WERDELIN, C. (1935). Undersøgelser over tuberkelbakterietyper hos hesten. **[Types of Bacilli in Equine Tuberculosis]**.—*Maanedsskr. Dyrlaeg.* **47.** 81-105. [27 refs.]

The author reviews earlier work on this subject and describes three cases of tuberculosis in the horse, in which much work was done to determine the type of bacilli present.

In the first case a filly, which was living under natural exposure to avian infection only, gave a positive reaction with avian tuberculin and died after an illness of several months. *Post-mortem* examination revealed hepatization of the lungs and fresh proliferative peritonitis. The avian type of bacillus was isolated. The second case was a seven-year-old horse exposed to natural avian infection. It gave a positive reaction with both avian and bovine tuberculin, the reaction being stronger with the former. There had been attacks of epistaxis and there was an ulcer on the nasal septum (glanders suspected). On *post-mortem* examination, tuberculous pneumonia with pleurisy and lesions on the surface of the liver and spleen were found. The avian type of bacillus was isolated.

The third case was a butcher's horse addicted to the peculiar habit of drinking fresh blood and eating offal. *Post-mortem* findings were ulcers on the nasal septum, proliferative pleurisy, pericarditis and myocarditis. A culture isolated appeared to grow like the bovine type, but it was of low virulence for experimental animals (especially the hen and rabbit) and was not definitely typed.

—GUSTAV NAERLAND (FARSUND).

DARANYI, J. (1935). Valeur immunisante du BCG et des vaccins tués pour le cobaye. **[The Immunizing Power of BCG and Killed Vaccines for the Guinea Pig]**.—*Ann. Inst. Pasteur.* **55.** 284-293. 1 fig., 3 tables.

The author briefly reviews the various methods which have been tried to bring about immunization against tuberculosis, and disagrees with certain negative findings of some workers regarding the immunizing properties of BCG.

He tested the immunity of guinea pigs, treated with BCG vaccine and killed human and bovine types of tubercle bacilli, using as the test infection bacilli of the human type or a mixture of bacilli of the human and bovine types, administered by inhalation.

His findings show that the BCG-treated animals were slightly more resistant to this artificial infection and they at least point to the probability of greater resistance to natural infection. He also found that when BCG was injected into infected guinea pigs it appeared to hasten the tuberculous process.—C. V. WATKINS.

RAMÍREZ, M. (1935). Resultados negativos de la vacunación antituberculosa, de las terneras y de los niños, mediante el B.C.G., y la Becegitis de los mismos. **[Unsatisfactory Results obtained with BCG in Human and Animal Medicine].**—*Rev. Hig. Sanid. pecuar.* **25.** 824-838.

No experimental work is reported in this article ; the author only reviews reports of the unsatisfactory results following the use of BCG, especially those of WATSON (Canada).

He maintains that vaccination with BCG does not immunize against tuberculosis. On the other hand, he believes that it is possible for BCG to re-acquire virulence, and that in some cases it produces disease in children and young cattle. He shows statistics which indicate that in vaccinated groups the average morbidity is not less than in groups of non-vaccinated animals.

—J. VIDAL MUNNÉ (BARCELONA).

FINZI, G. (1934). La vaccinazione contro la tubercolosi. **[Antituberculosis Vaccine].**—*Profilassi.* **7.** 198-199. 1 table.

The author describes the immunization of cattle against tuberculosis by means of a new non-virulent vaccine prepared in his laboratory.

It is claimed that the vaccine is incapable of producing tuberculosis in any naturally susceptible animal, including man. A local non-suppurative lesion of variable size is set up after subcutaneous injection of the vaccine, and antibodies to tuberculosis are produced, but no particular sensitivity to tuberculin.

The author considers that this method of vaccination should be of particular value in districts where calves are born in badly infected surroundings.

Calves should be vaccinated as soon as possible after birth and certainly within the first 15 to 30 days of their lives. It is not necessary to adopt special methods of rearing if good hygienic accommodation is provided and if the calves are isolated.

The vaccine is a suspension of bacilli and will keep for 12 months ; the dose is 10 c.c. The vaccine is injected into the subcutaneous tissue of the lower third of the neck.

Calves are revaccinated after two or three months ; thereafter, a double dose of the vaccine is given every six months in the same region. Up to the fourth or fifth injection the local reactions produced by the revaccination are characteristic and always form a vaccinal nodule larger than the previous one.—K. D. DOWNHAM.

BEHNER, Dorothy M. (1935). **The Stability of the Colony Morphology and Pathogenicity of** *BCG.*—*Amer. Rev. Tuberc.* **31.** 174-202. 24 figs. on 1 plate. [Numerous refs.]

The routine inoculation of animals with BCG vaccine, as prepared in the New York City Department of Health Research Laboratories, has never resulted in the production of progressive lesions. In this article, experiments are described which aimed at the development of a virulent substrain. The four principal methods used were colony selection followed by pathogenicity tests of all the variants obtained, cultivation on immune serum, cultivation on normal serum and passage through animals. In no case was any evidence obtained that BCG was capable of regaining virulence.

It is pointed out that generalized tuberculosis, as a result of spontaneous infection, is not uncommon in laboratory animals and this fact is probably responsible for certain mistakes which have arisen concerning the alleged virulence of BCG. In the author's experience two BCG guinea pigs were found simultaneously with extensive tuberculosis – one of a human and one of a bovine type – which

could not be explained on the grounds of dissociation. It is also reported that an accidental contamination of a BCG culture with an avian strain took place, and it is suggested that occurrences of this nature are liable to arise in any laboratory. It is frankly postulated that many of the positive results reported in the literature can be explained in this way.—R. E. GLOVER.

WERDELIN, C. (1935). Om dyrkning af fjerkraetuberkelbakterier paa Løwensteinsubstrat. **[Culture of Avian Tubercle Bacilli on Löwenstein's Medium].**—*Skand. VetTidskr.* **25.** 725-730. 2 figs. [English summary: abst. from orig.]

The author is of opinion that the type of *Mycobact. tuberculosis* can now be determined simply by means of cultures, without the aid of animal inoculations. On Löwenstein's medium he isolated the avian strain from 39 cases of spontaneous tuberculosis in fowls. The colonies are more raised from the surface of the medium than those of the bovine strain. The addition of glycerin to the medium favours the growth of the avian strain. Concentrations of up to 6 per cent. do not arrest the growth.—H. BERTHELSEN (STOCKHOLM).

SCHAEFER, W. (1935). L'existence de deux types sérologiquement distincts du bacille de la tuberculose aviaire. **[Two Serologically Distinct Types of the Avian Tubercle Bacillus].**—*C. R. Soc. Biol. Paris.* **120.** 1185-1188. [1 ref.]

In a previous publication [see this *Bull.* **6.** 5.], the author showed that avian tubercle bacilli contained a group antigen common to other acid-fast species and a specific antigen peculiar to the avian strain.

In this paper he continues his study and, in addition to confirming the existence of these two antigens, shows the existence of a third specific antigen corresponding to one of two main types into which he has been able to group his avian strains.—GWILYM O. DAVIES.

WATANABE, M. (1935). **Tubercle Bacillaemia.**—*J. Jap. Soc. vet. Sci.* **14.** 220-231. 4 tables, 5 charts. [12 refs.] [In English].

The author gives a summary of the research carried out by other workers and states that the results so far obtained have been very varied. In his own experiments, he used the blood of infected guinea pigs, goats and cows, most of the guinea pigs and some of the cows having been artificially infected. He employed the methods of cultivation of Löwenstein, of Iibuchi and of Watanabe. The best results were obtained with Watanabe's method, using the following technique :– 2 c.c. of blood from the animal to be tested and 8 c.c. of distilled water are shaken, centrifuged and the supernatant liquid removed : the sediment is washed in sterile distilled water, decanted and then smeared on the medium. For the demonstration of tubercle bacilli in the blood, guinea pig inoculation gave a higher percentage of positive results than cultivation.

After artificial inoculation, the blood of guinea pigs contained bacilli more frequently in the early and late stages of the disease than in the middle stage. An inoculation of tuberculin led to the demonstration of the bacilli in the blood of infected guinea pigs earlier and more frequently than in animals not so treated.

Tubercle bacilli were successfully cultivated from the blood of a naturally infected goat and of an infected cow ; the bacillaemia occurred most frequently at the height, or during the decline, of the fever.

In one infected herd tested with tuberculin, tubercle bacilli were more frequently demonstrated in the blood than in the milk.—F. H. MANLEY.

DEBELIĆ, S. (1935). Crveni vjetar (Erysipelas suis) u Jugoslaviji. [**Swine Erysipelas in Yugoslavia**].—*Vet. Arhiv.* **5.** 561-565. 2 tables, 1 chart. [Abst. from German summary].

Official statistics for 1924 to 1928 show that swine erysipelas was present continuously or intermittently in 23 departments, while no cases occurred in the remaining ten departments during that period.

MITCHELL, C. A., REID, J. C., & WALKER, R. V. L. (1935). **An Outbreak of Glanders of Low Pathogenicity.**—*Rep. vet. Dir. gen. Dep. Agric. Can. 1935.* pp. 67-73. 2 tables. [1 ref.]

Post-mortem examinations were carried out on 16 horses which had reacted to the subcutaneous mallein test. With three exceptions, only minute lung lesions were found. The lesions from all the animals were studied bacteriologically and also by the inoculation of male guinea pigs. The authors state that cultures having the characteristics of *Pfeifferella mallei* were isolated from two of the 15 reactors to the subcutaneous test, presenting slight but suggestive lesions of glanders. A detailed study of one strain indicated that it possessed low virulence and pathogenicity. The animal from which this strain was isolated failed to react to the complement-fixation test. No essential difference was found between the lesions of the two reactors from which cultures were obtained and the lesions found in the majority of other reactors examined.

I. MANNINGER, R. (1935). A septikaemia haemorrhagica oktana és az ellene való védekezés. [**Aetiology and Prophylaxis of Haemorrhagic Septicaemia**]. —*Allatorv. Lapok.* **58.** 7-11 and 44-47. [1 ref.]

II. FEKETE, L. (1935). Uj nézetek a baromfikolera oktanáról és az ellene való védekezésról. [**New Views on the Aetiology and Prophylaxis of Fowl Cholera**].—*Ibid.* 130-131. [2 refs.]

I. This is a Hungarian version of a paper already abstracted [see this *Bull.* **5.** 113].

II. The author criticizes the views set forth by MANNINGER on the aetiology of haemorrhagic septicaemia and by CSONTOS on the causes of outbreaks of fowl cholera. Though the author admits the great importance of predisposing factors in the aetiology of fowl cholera, he expresses some doubt as to the existence of carriers on infected premises in so high a percentage as assumed by CSONTOS and disagrees with the view that, on farms where fowl cholera is prevalent, the improvement of sanitary conditions would be sufficient to control the disease.

—A. KOTLÁN (BUDAPEST).

GUNTHER. (1935). Zur Frage, ob und gegebenenfalls wie eine sichere Diagnose Schweinseuche möglich ist. [**Diagnosis of Swine Plague**].—*Tierärztl. Rdsch.* **41.** 627-631 and 647-649.

Swine plague was a name given to a septicaemic and pneumonic condition of pigs which was formerly thought to be caused by a member of the genus *Pasteurella.* Diagnosis was based upon the isolation of the organism in pure culture. More recently, considerable information has been collected regarding the diseases of pigs, in view of which ideas about swine plague must be considerably modified.

Young pigs show a respiratory type of illness now known as swine influenza, of which the cause is a filtrable virus acting generally in conjunction with *Haemophilus influenzae suis.* The so-called *Past. suiseptica* may be found as a secondary invader in chronic cases of this disease. Similarly pigs suffer from the virus of swine fever, a disease frequently complicated by secondary invasion by *Salmonella cholerae-suis* [*Bact. suipestifer*] or by *Past. suiseptica.*

In order to demonstrate *Past. suiseptica* as a cause of disease *sui generis*, it would be necessary to have an outbreak of disease showing classical symptoms and lesions of swine plague as described by SCHUTZ. Other possible causes of disease (in particular the viruses of swine fever and swine influenza) would have to be excluded. It would be necessary to isolate *Past. suiseptica* in pure culture from animals suffering from the disease and to reproduce the disease by artificial infection of susceptible pigs by intranasal instillation of this organism. In addition it would be necessary to demonstrate natural spread by contact of the artificially produced disease.

From available evidence it would appear highly improbable that *Past. suiseptica* does cause any disease *sui generis*. Consequently isolation of this organism serves as no index for the diagnosis of any specific disease. The differential diagnosis from swine fever would be easy or difficult according to the type of outbreak. Even transmission experiments may leave the diagnosis of swine fever in doubt, and the histological examination for inflammatory changes in the central nervous system and adrenals is not infallible. The differential diagnosis of swine influenza is also difficult when adequate information is lacking, as the isolation of *H. influenzae suis* is not necessarily diagnostic of the disease. In conclusion the author gives as his considered opinion that no such disease as acute swine plague exists, whilst the so-called chronic swine plague is really a complication of swine influenza.
—E. J. PULLINGER.

WRIGHT, Joyce. (1936). **An Epidemic of *Pasteurella* Infection in a Guinea-Pig Stock.**—*J. Path. Bact.* **42.** 209-212. [5 refs.]

This is an account of an epidemic of fibrino-purulent serositis in guinea pigs. In a stock of about 800 guinea pigs the losses varied from 30 to 60 per month and in one month reached 143. The causal organism conformed in its morphological, cultural, biochemical and serological characteristics to those of the pasteurella group. The chief lesions were fibrino-purulent serositis of the pericardium and pleurae with collapse, congestion or partial consolidation of the lungs. A peritonitis may also be present.—GWILYM O. DAVIES.

DEBONÉRA, G., & MATTHAIAKIS, E. (1935). Sur l'épidémiologie du choléra aviaire en Grèce. **[The Epidemiology of Fowl Cholera in Greece].**—*Rec. Méd. vét.* **111.** 476-481. 1 fig. [2 refs.]

In Greece the highest mortality in fowls is caused by fowl cholera ; it occurs far more frequently in winter than in summer, the highest incidence being in November. It occurs most frequently in the flocks of the small farmers where the fowls are all in close contact under bad hygienic conditions. The spread of the disease is encouraged by buying in the open market. Ducks and geese are also affected. Mild outbreaks may occur because of the development of infection to a strain of low pathogenicity in birds with reduced vitality, but the severe outbreaks must be due to strains of high virulence. The presence of many carriers of the disease is a serious factor in accounting for the extensive nature of the outbreaks that occur in Greece.—F. H. MANLEY.

PETRIE, G. F. (1936). **The Occurrence of Typhoidal Bacilluria in a Horse.**—*J. Path. Bact.* **42.** 75-78. 1 table, 1 chart. [4 refs.]

A mare aged 15 or 16 years was immunized with highly virulent smooth strains of *Salmonella typhi* which contained " Vi " antigen. Three immunizing courses of living and killed suspensions were given, and five days after the last injection the animal developed a typhoid bacilluria and a subacute nephritis

similar to that which occurs in typhoid fever in man. The horse was kept under observation for 25 days and finally destroyed. Cultures from the blood, liver, spleen and lungs were negative.—GWILYM O. DAVIES.

KONNO, T., & HASHIMOTO, K. (1934). **Antigenic Analysis of *Salmonella abortus equi* and other Salmonellas.**—*9th Rep. Govt Inst. vet. Res. Fusan, Japan.* Pt. 1. pp. 69-102. 18 tables. [10 refs.] [In Japanese : abst. from German summary p. 10 of Pt. 2].

The relationship between the antigens of *S. abortus-equi* and *S. paratyphi* B. or *S. typhi-murium* is confined to the " O " somatic antigens. Whilst the " O " antigens of *S. paratyphi* B and *S. typhi-murium* are characteristic for themselves, they include the " O " antigen of *S. abortus-equi*. By adequate absorption tests, using boiled suspensions of bacteria, this relationship can be demonstrated. [This is not a new observation : it is expressed in the Report on the Genus Salmonella by the following formulae :–

	O.	H.	
		specific.	non-specific.
S. paratyphi B.	IV, V	b	1. 2.
S. typhi-murium	IV, V	i	1. 2. 3.
S. abortus-equi	IV	enx.	—

see this *Bull.* **5.** 63].—R. LOVELL.

BUZNA, D. (1935). A Bacillus suipestifer kimutatása dúsító eljárással. [**Demonstration of *Salmonella cholerae-suis* by the Enrichment Process**].—*Allatorv. Lapok.* **58.** 91-94. 1 fig., 3 tables. [13 refs.] [Abst. from abst. in *Rev. gén. Méd. vét.* **44.** 552-553].

A U tube is filled with sand impregnated with ox bile and is sterilized. The material to be tested is sown into one branch of the tube which is then incubated. After 24 hours, material from the other branch of the tube is sown on to Drigalski's bile medium.

HEMSHORN, A. (1935). Bakteriologische, serologische und pathologisch-anatomische Untersuchungen im Zusammenhang mit natürlichen und künstlichen Enteritis-Infektionen bei Enten. [**Investigations in Connexion with Natural and Experimental Paratyphoid Infection of Ducks**].—*Inaug. Diss., Berlin.* pp. 32. 8 tables. [19 refs.]

As a result of studying an outbreak of *Salmonella typhi-murium* infection, the author concludes that specific agglutinins present at a titre of 1 : 20 have no significance ; a titre of 1 : 40 is suspicious and one of 1 : 80 is definite evidence of infection. The criterion of infection was taken as the successful isolation of the organism from faeces. *Post mortem* the organism was isolated from the ovaries as well as from other tissues of infected birds.—E. J. PULLINGER.

SCHÖNBERG, F. (1935). Ueber die Infektion von Enteneiern mit Breslaubakterien vom Eileiter aus. Gleichzeitig ein Beitrag zur Verhütung der durch Enteneier verursachten Lebensmittelvergiftungen. [**The Infection**

of Ducks' Eggs with *Salmonella typhi-murium via* **the Oviduct. A Contribution to the Prevention of Food Poisoning from Ducks' Eggs**].—*Berl. tierärztl. Wschr.* **51.** 474-476. 1 table. [20 refs.]

An outbreak of human food poisoning due to *S. typhi-murium* was traced to eggs from a flock of four ducks and one drake. These birds, and 50 of their eggs, were examined. The droppings of all four ducks proved infected, but the drake's faecal matter was negative. No symptoms of illness were exhibited. Agglutination tests showed titres of 1 : 400 to 1 : 1,600 against *S. typhi-murium* antigen. *Post-mortem* examinations revealed greyish-yellow foci the size of millet seed in all the livers, and the ovaries of two ducks contained degenerate as well as healthy follicles. In the ducks, the oviductal mucous membrane was constantly found to be bacteriologically infected, and sometimes also the ovary, liver, kidney, and intestinal contents. The drake showed infection only in the liver and spleen. Nine out of 50 eggs proved to be infected, eight in the yolk and white, one on the shell, and three both inside and outside.

The author is of the opinion that infection from the egg-laying organs is more important than faecal contamination in the cloaca. A method of systematic examination of blood and faeces from duck farms is urgently needed to cope with such outbreaks.—NORMAN HOLE.

NEWSOM, I. E., & CROSS, F. (1935). **Third Outbreak of Paratyphoid Dysentery in Lambs.**—*J. Amer. vet. med. Ass.* **86.** 534-536. 1 table. [4 refs.]

In 1923 and 1929 the authors reported outbreaks of paratyphoid dysentery in lambs involving, in the first outbreak, 30,000 lambs with a death rate of 6·2 per cent. and, in the second outbreak, 1,600 lambs with a loss of only 30 animals. The third outbreak, dealt with in the present report, affected 1,500 lambs, the total loss being 111. Of those examined bacteriologically, *Salmonella typhi-murium* (*aertrycke*) was isolated from the spleen.

The predisposing cause appeared in each instance to be a long railroad journey with insufficient feed.—R. LOVELL.

SCHNEIDER, L. (1935). A fejlodo malacok hevenyés paratyphusának oktanáról és az ellene való védekezésrol. [**Aetiology of Acute Paratyphoid of Young Growing Pigs and Immunization against It**].—*Allatorv. Lapok.* **58.** 169-176. 1 table. [Numerous refs.] [Abst. from abst. in *Rev. gén. Méd. vét.* **44.** 534].

The author groups the causes of acute paratyphoid of swine as follows :—(a) metabolic disorders, faulty nutrition, excess or, occasionally, insufficiency of P_2O_5, excess of Ca and insufficiency of NaCl, and (b) the after effects of vaccination against swine fever and swine pox, castration, fatigue due to transport, and unfavourable climatic conditions.

There is some discussion on immunization ; the author considers that the disease should be combated by attention to nutrition and environmental conditions.

KONNO, T., & TANIKAWA, T. (1934). Ueber Bakterien der Paratyphusgruppe, welche aus Ferkeln isoliert wurden, unter besonderer Berüchsichtigung der Antigenanalyse. [**Antigenic Analysis of Paratyphoid Bacteria Isolated from Piglets**].—*9th Rep. Govt Inst. vet. Res. Fusan, Japan.* Pt. 2. pp. 47-58. 9 tables. [20 refs.] [In German : Japanese summary pp. 134-135 of Pt. 1].

Strains of paratyphoid bacteria isolated from piglets with a swine-fever-like disease were shown to fall into two types biochemically. Serological investigation showed them to be *Salmonella cholerae-suis* var. Kunzendorf [formerly *Bact.*

suipestifer European variety] and *S. typhi-suis* var. Voldagsen. [Serologically these two organisms are identical having the following antigenic structure :–

	O.	H.	
		Specific.	Non-Specific.
S. cholerae-suis var. Kunzendorf	VI. VII	—	1. 3. 4. 5.
S. typhi-suis var. Voldagsen	VI. VII	—	1. 3. 4. 5.

Culturally they are different and, as the authors show, the former produces acid early in litmus milk – followed by alkalinity, ferments mannite but not arabinose and produces gas in dextrose broth. The latter, *S. typhi-suis* var. Voldagsen, produces acid in litmus milk, which is not followed by alkalinity, does not ferment mannite but ferments arabinose, and either does not produce gas or in small amount only in dextrose broth].—R. Lovell.

Herrera, A. A. (1935). El aborto epizootico y la presencia de aglutininas en las leches consumidas en Bogotá. [**Epizootic Abortion and the Presence of Agglutinins in Milk Consumed in Bogotá (Colombia)**].—*Rev. Med. vet., Bogotá.* **6.** 4-19.

A review of the existing knowledge of epizootic abortion leaves no doubt that it is one of the greatest world problems from both the economic and public health points of view. It is no exaggeration to say that *Brucella abortus* infection exists on 90 per cent. of the farms in the neighbourhood of Bogotá. The importance of milk as a vehicle of infection is emphasized by the results of agglutination tests of 87 samples from farms in the area, of which 41 were positive, 18 doubtful, and 28 negative.

The rapid agglutination method was employed ; reactions in dilutions of over 1 : 20 were considered positive, and those at 1 : 20 were regarded as doubtful.

Blood serum from the same animals did not give corresponding results ; in 10 per cent. of such cases the whey gave positive, and the serum negative, reactions.

The persistence and extension of the disease in the district is largely attributed to the inattention of stockowners to hygienic precautions, and to the concealment and unscrupulous disposal of infected animals. Propaganda, sanitary legislation and free blood-testing are suggested.—Norman Bisset.

Viglietta, C. (1935). Osservazioni epidemiologiche sulla brucellosi nella provincia di Derna. [**Epidemiology of Brucella Infection in the Province of Derna, Libya**].—*Arch. ital. Sci. med. colon.* **16.** 526-532. 1 fig., 1 table. [2 refs.] [English, French and German summaries : abst. from orig.]

Brucella infection in man was almost unknown in Derna until the spring of 1934. Eight cases only were reported between 1920 and 1933. The author investigated the 1934 outbreak and considered that it was due to an infection of sheep and goats in the province : 19 per cent. of the goats and 17 per cent. of the sheep were found to be infected with *Br. melitensis.*

Lang. (1936). Versuche zur Nachprüfung des Volkmarschen Verfahrens der Resistenzerhöhung der Rinder gegen das seuchenhafte Verkalben. [**Tests of Volkmar's Method for Controlling Bovine Contagious Abortion**].—*Münch. tierärztl. Wschr.* **87.** 13-16. 3 tables. [4 refs.]

Experiments indicated that Volkmar's method was of no value in raising the resistance of bovines to contagious abortion. Volkmar's reagent consists of a mixture of salts of a number of minerals in a watery solution. Treatment consists of a series of injections of this fluid.—E. J. PULLINGER.

WALL, S. (1935). Vaccinationens betydelse som komplement till stamping-out-metoden mot sjukdomen smittsam kastning hos nötkreatur. [**Value of Dead Vaccine in the Eradication of Bovine Contagious Abortion**].—*Skand. VetTidskr.* **25.** 661-681. 5 tables. [7 refs.] [English summary: abst. from orig.]

From earlier publications the author first gives a series of agglutination titres set out in tables showing :- (1) that the blood-reaction in cows treated with one single dose of dead vaccine has usually disappeared at three and, in all cases, at six months after treatment ; (2) that, in cows treated once with living vaccine, the blood-reaction is still present at six months, or even longer, and (3) that no excretion of bacteria with the milk has been observed in cows with an agglutination titre below 1 : 15.

On the basis of these observations, all reactors in ten recently infected herds were strictly isolated or slaughtered immediately and the non-reactors vaccinated with a dead vaccine. In the remaining three herds, one or more cows gave high titres three months after vaccination and therefore treatment with living vaccine was resorted to.

Although the dead vaccine method is highly recommended by the author, an eradication scheme to be followed in each different herd, as circumstances dictate, is drawn up at the end of the paper.—GUSTAV NAERLAND (FARSUND).

SHOLL, L. B. (1935). **Some Observations on the Pathology of Brucella abortus Infected Udders of Heifers.**—*Cornell Vet.* **25.** 354-358. 2 tables. [2 refs.]

A series of 22 heifers, varying in age from eight months to three years, which reacted positively to the agglutination test for *Br. abortus*, was examined and it was found that the udders of 14 of these animals were infected with the organism. The udders of this series were also examined histologically, and evidence of interstitial mastitis was found in 20 of them. Another seven heifers, which were not infected with *Br. abortus*, were subjected to a similar examination, and a slight to moderate interstitial mastitis was found only in three cases. It is concluded that the udders of heifers may become infected with *Br. abortus* as early as when eight months old and that lesions of interstitial mastitis, which the author considers may result from infection with this organism [see this *Bull.* **2.** 589.], may occur in the udders of non-lactating animals.—F. BLAKEMORE.

HAUDUROY, P. (1935). Le diagnostic des brucelloses par les méthodes de laboratoire. [**Laboratory Diagnosis of Brucella Infections**].—*Rev. Microbiol., Paris.* **1.** 379-392. 1 fig., 5 tables.

In this article, the author has summarized the present state of knowledge concerning the bacteriological diagnosis of brucella infections. He first deals with blood culture in man and animals, giving details of technique, the most suitable media for this purpose and the identification and differentiation of isolated strains. This is followed by a consideration of serological methods, particularly the agglutination test in its various forms. This includes the preparation of antigen, the technique of the slow and rapid methods and the interpretation of results. Finally, the author discusses the examination of milk by cultural methods, by agglutination tests and by animal inoculation.—GWILYM O. DAVIES.

WIGHT, A. E. (1935). **The Nation-Wide Campaign to control Bang's Disease.** —*J. Amer. vet. med. Ass.* **87.** 291-295.

This campaign, which was started in 1934, consists of the slaughter of animals reacting to the agglutination test and the payment of compensation.

During the first year, about 210,000 herds containing 3,300,000 animals were tested and 381,000 reactors were removed from 80,000 herds. No infection was found to be present in the remaining 130,000 herds. On being retested, from 60 to 65 per cent. of the infected herds were found to be free from infection.

The testing of all cattle in a given area was carried out in two counties in Virginia, and 1,995 herds containing 8,923 animals were tested. Infection was found to be present in 250 herds and the test showed 453 positive and 420 suspicious reactors. Retesting of 26,191 suspicious reactors showed 5,371 positive, 15,285 negative and 5,535 still suspicious. Retesting of 764 suspicious reactors to two tests showed 174 positive, 279 negative and 311 as still suspicious.—W. J. IRONSIDE.

OLSON, C., & FELDMAN, W. H. (1936). **Attempts to isolate Brucella abortus from the Blood of Dogs in Experimental Brucellosis.**—*J. Amer. vet. med. Ass.* **88.** 51-54. [7 refs.]

Five dogs each received intravenously a dose of 1 c.c. of a heavy saline suspension of the porcine strain of *Br. abortus*. Blood cultures made 24 hours after the injection were positive in all cases. Only occasional cultures were positive thereafter – up to 14 days – no further tests being made. Tests were carried out 16 days after the injection using horse serum and histamine to discover if anaphylactic shock liberated *Br. abortus* into the blood stream. With one exception negative results were obtained.

Br. abortus was isolated from the spleen of all the animals at *post-mortem* examination.—P. L. SHANKS.

PÉRÉS, G., & GRANON-FABRE, P. (1935). La mélitococcie chez le lapin. [*Brucella melitensis* **Infection in the Rabbit**].—*Rev. gén. Méd. vét.* **44.** 201-204. [Also appeared in *Bull. Soc. Sci. vét. Lyon.* **38.** 109-112].

On a farm in which *Br. melitensis* infection was severe in goats and sheep, deaths and abortions occurred in tame rabbits kept in conditions in which there was contact with the sheep and goats.

The authors describe the observations made on the rabbits examined. At the *post-mortem* examination of a female rabbit, the lesions found were a suppurating maxillary lymph gland, multiple abscesses in the spleen and liver, small disseminated granules in the lungs and pyometritis. *Br. melitensis* was isolated from these lesions and from the bone-marrow. In a male rabbit, less extensive lesions affecting only the spleen and liver were found and *Br. melitensis* was isolated from the spleen.

The history of this outbreak of disease is traced through :– (1) aborted lambs on a neighbouring hill ; (2) a bitch which aborted one month after eating some of the aborted lambs ; (3) abortion in goats ; (4) abortion in sheep ; (5) a case of undulant fever ; (6) brucella infection in rabbits, and (7) poultry losses, especially clear eggs, dead embryos and the early deaths of chicks. [The disease in the bitch and the poultry losses are not, however, well authenticated].

The authors conclude that the rabbit is thus proved to be a possible vector of brucella infection.—C. V. WATKINS.

BAUMANN, R., & KUSCHER, A. (1935). Ueber die bei Meerschweinchen durch Bang-Bacillen hervorgerufenen Veränderungen des Skelets und der Gelenke.

[**Skeletal and Joint Changes in Guinea Pigs Infected with** *Brucella abortus*]. —*Arch. wiss. prakt. Tierheilk.* **69.** 474-485. 5 figs. [Numerous refs.]

The authors describe the changes produced in the bones, cartilages and joints of guinea pigs on inoculation of a strain of *Br. abortus*. They give a brief review of the literature on the subject. The costal cartilages showed changes consisting of resorption and formation of cavities and canals, with enlargements due to new cartilage formation in an attempt to repair the damage. The inflammatory process was of a chronic specific type.

The vertebral bodies, ribs and sternum showed an inflammatory hyperaemia and, in the marrow, there were seen foci of epithelioid and giant cells, often proceeding finally to necrosis and abscess formation. In the bone itself there was found a resorption of lamellae and replacement by new structures. The joints were affected with an arthritis, periarthritis and tendovaginitis and, in addition, a bursitis in some cases. The final joint lesion is an anchylosing arthritis deformans.

The bone and joint changes are illustrated by three radiographs.—E. G. White.

Ajello, P. (1935). Presenza della Brucella melitensis nel contenuto di un igroma acuto precarpico in un caprone. [**Presence of** *Br. melitensis* **in an Acute Precarpal Hygroma in a Goat**].—*Nuovo Ercol.* **40.** 525-530. 2 figs. [Numerous refs.]

A five-year-old goat was observed to be suffering from a precarpal hygroma which was tense, hot and painful and which had developed in about 15 days. Fluid from the hygroma and blood serum from the animal agglutinated suspensions of *Br. melitensis*. This organism was also isolated in pure culture from the hygroma. The author considers that it was the primary cause of the lesion.—J. A. Nicholson.

Martini, G. (1935). L'importanza dell'albume d'uovo nella differenziazione delle " Brucelle " sui terreni allo'uovo. [**The Importance of the Albumen in the Differentiation of** *Brucella abortus* **and** *Br. melitensis* **by Growth on Egg Medium**].—*Boll. Ist. sieroter. Milano.* **14.** 431-439. 7 tables. [16 refs.] [German summary : abst. from orig.]

The author has confirmed that *Br. abortus* fails to grow on Petragnani's egg medium even after prolonged incubation, whereas *Br. melitensis* grows readily in this medium. Tests showed that this phenomenon is due to the presence of the egg white. It is unconnected with any lytic factor, and heating the albumen to 100°C. before incorporating it in the medium does not alter the effect produced. The extreme alkalinity of a medium containing egg white was found to be the cause of the phenomenon, since reducing the pH of Petragnani's medium from 8·4 to 6·8 enabled both types of brucella to grow readily. The author concludes that *Br. melitensis* possesses the power of acidifying the surface of a medium and thus can establish itself, whereas *Br. abortus* lacks this property.—J. A. Nicholson.

Bruschettini, G. (1935). Différenciation bactériologique des brucella. [**Bacteriological Differentiation of Brucella**].—*Rev. Microbiol., Paris.* **1.** 341-358. [Numerous refs.]

The author discusses at considerable length the various distinguishing features of *Br. abortus* and *Br. melitensis* and considers the evidence for and against accepting the two organisms as identical. The methods usually employed for identifying these organisms are also described.

There is no new matter in this paper.—Gwilym O. Davies.

BRUSCHETTINI, G. (1935). Suite des recherches sur le développement des Brucellae dans un milieu au lait et à l'oeuf. **[The Development of Brucella in Milk-Egg Medium]**.—*Boll. Sez. ital. Soc. int. Microbiol.* **7.** 224-227. 1 table. [5 refs.] [In French].

The author's further investigations on the differentiation of *Br. abortus* and *Br. melitensis* confirm the value for this purpose of media containing egg and milk. It is apparently the egg albumin which inhibits the growth of *Br. abortus*. *Br. melitensis* grows readily on milk-egg media.—GWILYM O. DAVIES.

VITTONE, R. (1935). Le milieu de Petragnani dans la différentiation des "Brucellae". **[The Use of Petragnani's Medium for the Differentiation of the Brucella Group]**.—*Boll. Sez. ital. Soc.int. Microbiol.* **7.** 277-278. [In French].

According to DE SANTIS, *Br. melitensis* and *Br. paramelitensis* grow abundantly on Petragnani's egg medium with the frequent production of a light or dark green pigment. *Br. abortus* and *Br. parabortus* on the contrary fail to grow on this medium.

Vittone repeated this work employing 56 strains of *Br. abortus*, 35 strains of *Br. melitensis* and 6 of *Br. paramelitensis*. He concludes that in a large number of instances the method is of considerable value for the differentiation of strains, but that errors occur and that it is less accurate than that based on the bacteriostatic action of dyes and the production of H_2S.—T. M. DOYLE.

MARCHI, G. (1934). Sulla classificazione dei ceppi di Brucella isolati dai bovini delle provincie lombarde. **[Bovine Brucella Strains Isolated in Lombardy]**. —*Clin. vet., Milano.* **57.** 972-986. 1 table. [33 refs.]

The author considers that agreement has not yet been reached as to whether undulant fever in man can be caused by *Br. abortus*. It has been observed that, in Lombardy, notwithstanding severe outbreaks of abortion among cattle, cases of undulant fever in the affected districts have not been unduly numerous and the infection in the majority of cases has been traced to sheep or goats. However, the possibility of *Br. melitensis* causing abortion in cattle, which then become a source of infection for man, must not be overlooked. In order to establish the strain of brucella affecting cattle in Lombardy, the author examined 45 strains from bovines together with eight strains known to be *Br. melitensis*, of which five had been originally isolated from cattle. Huddleson's method was used and also that of de Santis. All the strains from the cattle were found to be *Br. abortus*. —J. A. NICHOLSON.

HIBMA, A. M. (1935). De enting met boutvuurfiltraat. **[Immunization by Blackleg Culture Filtrate]**.—*Tijdschr. Diergeneesk.* **62.** 845-849. [3 refs.] [English, French and German summaries : abst. from orig.]

Up to 1923 blackleg caused several deaths every year among young cattle on the isle of Terschelling. At that time the author began to inoculate the young animals with a culture filtrate made of *Clostridium chauvoei* by the Ryksserumin-richting at Rotterdam. At first some animals died as a result of insufficient immunity and pathological tissue was sent to the institute in order to isolate the strains against which the filtrate was ineffective. By 1935, 3,300 animals were inoculated with a polyvalent vaccine prepared also from local strains without a single case of post-vaccination blackleg. Young calves received three inoculations of 5, 10 and 10 c.c. respectively ; older calves two doses of 10 c.c. each. The filtrate is an excellent prophylactic. During recent years no deaths were caused by *Cl. chauvoei*.—M. J. J. HOUTHUIS (ROTTERDAM).

KUHN, M. J. (1934). La hemoglobinuria de los bovinos (estudio anatomico). [**Haemoglobinuria of Bovines (Anatomical Study)**].—*Rev. Inst. bact., B. Aires.* **6.** 228-238. [1 ref.] [French and German summaries : abst. from orig.]

The work recorded was carried out with viscera obtained from a naturally occurring case of bovine bacillary haemoglobinuria. The disease was reproduced experimentally at the laboratory in three bovines, by intramuscular inoculation in two and by intrahepatic inoculation in one. With the exception of the changes at the seat of inoculation in the two animals infected by intramuscular inoculation, the lesions corresponded closely in all four cases. The most important changes observed in the intramuscularly inoculated animals were loss of condition and anaemia ; tumefaction, emphysema and degenerative changes in the muscle at the seat of inoculation ; extravasation into the myocardium ; necrosis of liver parenchyma commencing around the central vein, hyperchromasia at the edge of the necrotic liver tissue and hyperactivity of the reticulo-endothelial system ; degenerative changes and haemoglobin casts in the kidneys and haemoglobinuria. *Clostridium haemolyticum* [*Bacillus haemolyticus bovis*] was present in the liver capillaries and in the spleen.

The author concludes that bovine haemoglobinuria is an infectious disease caused by the anaerobic organism *B. haemolyticus bovis*, and that the outstanding lesions are haemolysis, capillary haemorrhage and progressive irreversible hepatitis. The lesions are suggestive of infection *via* the portal vein from the intestine with localization in the liver.—R. S. ROBERTS.

RADTKE, G. (1935). Ueber die Erreger der Aktinomykose. [**Causal Organism of Actinomycosis**].—*Berl. tierärztl. Wschr.* **51.** 797-799. [Numerous refs.]

So-called actinomycotic lesions may be caused by *Actinomyces bovis*, *Actinobacillus lignieresi*, or by micrococci. *A. bovis* infection may be diagnosed by serological tests. There appears to be more than one serological group in the species. Polyvalent dead vaccines have been used therapeutically for human beings. Animals infected with *Actinobacillus lignieresi* develop specific agglutinins to a low titre. There appears to be only one serological group in the species. The micrococci concerned with the causation of actinomycotic lesions resemble *Staphylococcus aureus*. The processes involved in the production of granulomatous lesions are briefly discussed, as is the question of the natural portal of entry of the infections.—E. J. PULLINGER.

BAUDET, E. A. R. F. (1935). Sur une dermatomycose du chien, à l'aspect de favus, produite par un *Trichophyton* à culture faviforme. [**A Dermatomycosis of the Dog caused by a** *Trichophyton*].—*Ann. Parasit. hum. comp.* **13.** 568-575. 6 figs. on 1 plate. [12 refs.]

This is a description of a case which had the macroscopic and microscopic appearances of favus but which yielded a culture corresponding to the faviform *Trichophyton*. Full details of the cultures are described, and it is also stated that lesions which consisted of crusts containing filaments and spores were produced experimentally in dogs and guinea pigs.

The finding of *Trichophyton* or *Microsporon* species has been noted by others in animal favus. OTA and LANGERON, and LANGERON and MILOCHEVITCH consider that favus in animals is due to *Microsporon* (*Sabouraudites*).—GWILYM O. DAVIES.

DISEASES CAUSED BY PROTOZOAN PARASITES.

VAN DEN BRANDEN, F. (1935). Nouvelle contribution à l'étude de la transmission héréditaire du trypanosome. [**Hereditary Transmission of Trypanosomiasis**]. —*Ann. Soc. belge Méd. trop.* **15.** 567. [1 ref.]

This note records that the author was able to infect a rat with *Tryp. brucei* by inoculating into it blood from young rats born of a mother infected with *T. brucei*, although no trypanosome infection could be detected in the young rats by microscopic examination.—U. F. RICHARDSON.

MANRESA, M., & MONDONEDO, O. (1935). **Studies on Surra : III. A Survey of the Incidence of Surra in the Vicinity of the College of Agriculture with Observations on the Numerical Fluctuations of Tabanid Flies.**—*Philipp. Agric.* **24.** 111-125. 6 tables, 1 map. [9 refs.] [For abst. of previous articles in this series, see this *Bull.* **6.** 20].

The authors, continuing their studies on an outbreak of surra at the College of Agriculture, Los Baños, Philippine Islands, attempted to make a surra survey of horses, cattle and buffaloes within the municipality by microscopic examination of the blood. Out of 94 horses, 117 oxen and 283 buffaloes, only one buffalo was found to be infected, and this animal had been in close contact with the college stock. It is therefore concluded that the college outbreak must have been introduced from elsewhere.

From experimental observations made on the numbers of tabanids attacking animals, it is concluded that these flies are most prevalent from 5 p.m. until dark, being most abundant when the weather is calm and bright. The flies were present throughout the year, but the average number caught per day on one animal varied from three in October to 42 in May. The flies attacked oxen more readily than horses, and animals in the open more readily than those in stalls. No tabanids were caught on a stabled horse, although 34 were caught on a buffalo kept in a neighbouring open run during the same period. All the tabanids caught belonged to the species *Tabanus striatus*.—U. F. RICHARDSON.

DI DOMIZIO, G., & TARANTINO, G. B. (1935). Sul Trypanosoma brucei nei dromedari nella Somalia Italiana. [*Tryp. brucei* **Infection in Dromedaries in Italian Somaliland**].—*Arch. ital. Sci. med. colon.* **16.** 293-298. [English, French and German summaries]. [Abst. from abst. in *Boll. Sez. ital. Soc. int. Microbiol.* **7.** 361].

In Italian Somaliland, the dromedary was shown to be susceptible to experimental inoculation with *T. brucei*. Natural infection was encountered once only.

SCHILLING, C. (1935). Schutzimpfung gegen Tsetse- und Schlafkrankheit. [**Protective Inoculation against Tsetse Fly Disease and Sleeping Sickness**]. —*Tropenpflanzer.* **38.** 229-238.

The author refers to his work on the production of immunity against trypanosomes in horses and cattle by the inoculation of the animals as calves or foals [this *Bull.* **5.** 13, 122 and 618].

From the results of the experiments in which inoculated cattle were exposed to tsetse fly in Tanganyika Territory, he concludes that some adult cattle possess a resistance to trypanosomiasis which might, however, be due to previous infection in their youth. About 40 per cent. of young calves possess considerable resistance, but in attempts to immunize calves a preliminary resistance, similar to that which they are assumed to derive from an immune mother, should be given by inoculation

with a minimal infective dose of trypanosomes, or by injection of vaccines prepared from dead organisms. The latter method is recommended as it is free from serious risk ; out of 18 calves inoculated with minimal doses of trypanosomes, six animals died from the resulting disease.—U. F. RICHARDSON.

BOURGUIGNON. (1935). Contribution à l'étude des trypanosomiases des suidés au Congo belge. [**Trypanosomiasis of Swine in the Belgian Congo**].—*Ann. Soc. belge Méd. trop.* **15.** 491-499. [8 refs.]

The author discusses the records of porcine trypanosomiasis in the Congo. *Tryp. congolense* is commonly encountered in outbreaks of a chronic nature and *T. montgomeryi* may be associated with it. These two species are considered distinct as *T. montgomeryi* has been encountered in a state of purity. Acute trypanosomiasis of swine is considered to be due to infection with *T. simiae*, *T. rodhaini* being classed as a variety of *T. simiae*. In these acute outbreaks of trypanosomiasis, although the majority of the parasites belong to the *T. simiae* type, yet specimens of the *T. congolense* and *T. rodhaini* types can be detected. It is considered that these variations cannot be attributed to a mixed infection as the pure forms could not be separated, neither could guinea pigs be infected. The author believes that a close study of *T. simiae* would reveal that this species is polymorphic. He does not consider that the creation of a new species, *T. porci*, is helpful, but remarks that HORNBY's suggestion, that *T. simiae* may be a form of *T. congolense* modified by passage through swine, should be borne in mind.
—U. F. RICHARDSON.

ASCIONE, G., & DI BELLO, G. (1935). A proposito dell'antagonismo fra tuberculosi e tripanosomiasi. Ricerche egeguite col BCG ed il Trypanosoma brucei. [**Antagonism between Trypanosomiasis and Tuberculosis (BCG Infection)**].—*G. Batt. Immun.* **14.** 1073-1078. 3 tables. [6 refs.] [English summary : abst. from orig.]

In view of the findings of ORSI that tuberculous infection was able to prevent the infection of guinea pigs with *Tryp. brucei*, and even to eliminate a pre-existing trypanosome infection, together with his further findings that this antagonistic action appears to depend upon the vital activity of the bacterium, the authors undertook an investigation of the antagonistic power of BCG for which it has been claimed that, in spite of loss of pathogenicity, it retains the specific protective power against tuberculosis, and that it also possesses an aspecific antigenic value against other infections.

Groups of guinea pigs were inoculated with *T. brucei* and *Mycobact. tuberculosis*, either simultaneously, or by one inoculation before the other. The experiments indicated that BCG inoculation gave no protection against trypanosomiasis, as the survival period in the inoculated animals remained within the limits of seven to 14 days, the ascertained normal survival period for the strain of *T. brucei* employed.
—U. F. RICHARDSON.

CARRIEU, RAMBAULT, & PHILIP. (1935). La formol-leuco-gélification du sérum dans la leishmaniose. [**The Formol-Gel Test in Canine Leishmaniasis**].—*Pr. méd.* April 10th. 589.

At a meeting of the Society of Medical and Biological Science of Montpellier and Languedoc, the authors reported that they had obtained 12 positive results by the formol-gel test in the case of 12 dogs suspected of leishmanial infection, whilst no positive reactions were given by ten normal animals, and only two positive reactions were given in tests on 314 dogs suffering from various other diseases.
—U. F. RICHARDSON.

BENESCH, F. (1936). Ueber einen seltenen Fall von Trichomonadenabortus beim Rind. [**A Rare Case of Trichomonad Abortion in a Cow**].—*Wien. tierärztl. Mschr.* **23.** 33-35.

The author records a case of abortion in which trichomonads were detected, occurring after seven months of pregnancy. REISINGER suggests that the lesions described in this case point to the possibility of a co-existing infection with *Brucella abortus*.—U. F. RICHARDSON.

BRAUER, W. (1935). Untersuchungen über die Verbreitung und Bekämpfung der Trichomonadenerkrankung des Rindes. [**The Incidence and Control of Trichomonad Infection of Cattle**].—*Inaug. Diss., Giessen.* pp. 66. [Numerous refs.]

This thesis gives an interesting account of investigations into the incidence and control of bovine trichomonad abortion in eight municipalities in the neighbourhood of Giessen. In four of these areas attempts had been made to control the disease for some years, whilst in the other four districts control was instituted by the author. Two of the districts proved free from trichomonad infection and in these, whilst a small number of cases of sterility and endometritis were encountered, cases of early abortion and pyometra were absent. In the two areas free from trichomonad infection, genital vesicular exanthema, which is believed to be due to an ultra-visible virus, was present, but did not appear to be responsible either for abortion or sterility.

The principles adopted in control have consisted of an embargo on all service for a period of eight weeks, a careful examination of all adult animals which are divided into healthy, suspected and infected groups, and treatment of affected animals by expression of existent retained corpus luteum and irrigation of the uterus and vagina. The treatment of bulls which were chronically affected proved entirely unsatisfactory, but recently affected animals were treated successfully by washing out the preputial sheath with 1 : 1,000 " entozon " solution. For vaginal irrigation of cows 3 per cent. alum solution or 1 : 1,000 zinc sulphate is recommended. The difficulty of detecting infection in bulls is emphasized, and test services on virgin heifers are recommended before a bull is put into regular use. Treated cows should be kept under observation for four periods of heat before they can be considered free from infection.

In areas in which control had been adopted for some years a noticeably better result had been obtained where cows had been treated by the use of astringent and antiseptic suppositories before service, and bulls had been regularly washed with " entozon " or " chinosol " after service. The use of artificial insemination proved very valuable in reducing the economic loss involved in the embargo on services.
—U. F. RICHARDSON.

KRENN, E. (1935). Trichomoniasis bei der Taube. [**Trichomoniasis in Pigeons**]. —*Wien. tierärztl. Mschr.* **22.** 734-735.

This article records the detection of trichomonads in liver lesions of a pigeon from the neighbourhood of Vienna. The lesions are described as cheesy, greyish-yellow, sharply defined and about the size of a pea, closely resembling the liver lesions of blackhead in turkeys. Two other birds from the same farm were examined, but no trichomonads could be detected ; the author considers that the mortality in this flock was due to intestinal gout and not to trichomonad infection.—U. F. RICHARDSON.

YAKIMOFF, W. L. (1935). Les coccidies des bovidés domestiques et demi-sauvages. **[The Coccidia of Domestic and Partially-Domesticated Bovines].** —*Ann. Soc. belge Méd. trop.* **15.** 599-608. 4 tables. [11 refs.]

This article records the examination of two zebus, three bison, eight bison-aurochs, one gayal, four Ukrainian cattle, two Dutch cattle, one shorthorn cow and 12 stags for coccidial infection in the South of the Ukraine.

The semi-wild bovines exhibited the same coccidial infections as the domestic cattle, *Eimeria smithi* being the predominant species encountered, whilst only one animal exhibited infection with *E. zurni*. Of the 12 stags, two exhibited coccidial infection with a species of parasite which the author considers to be *E. wassilewsky*.
—U. F. RICHARDSON.

NIESCHULZ, C. (1935). Over coccidiënvrij opfokken van kuikens. **[Rearing of Chickens Free from Coccidiosis].**—*Tijdschr. Diergeneesk.* **62.** 565-567. 1 fig. [English, French and German summaries : abst. from orig.]

The author describes cages in which he successfully reared groups of five to eight chickens free from coccidiosis. The cages were 65 cm. long, 40 cm. broad and 30 cm. high, and the sides and floor were made of " eternite " which can be sterilized with a bunsen burner. The roof was in two parts and made of glass in wooden frames fitted together to allow a space for the suspension wire of an electric lamp of five to eight candle power for warming the cage. The remainder of the space between the parts of the roof was filled with wood to prevent the entry of dust. The lower half of the walls of the cage was lined with linen, and there was a wire gauze flooring, supported on wooden battens. Droppings were removed daily by means of the linen sack which, together with the gauze flooring and the lamp cover, was sterilized every day.—U. F. RICHARDSON.

VAJDA, T. (1934). Uj eljárás élosködok petéi és coccidium-oocysták gyüjtésére. **[New Method for Collecting Eggs of Parasites and Oocysts of Coccidia].**—*Allatorv. Lapok.* **31.** 161-162. 2 figs.

This new method is simply a combination of the glycerin-flotation method with a simple sedimentation, in order to isolate all the eggs or occysts from a given amount of faecal material. The method is as follows :– take 2 g. of faeces from a sheep or rabbit or 5 g. of faeces from a horse or bovine and, using the routine glycerin-flotation method, concentrate all eggs or oocysts available, then transfer the surface layer of glycerin, containing the eggs, to a test tube filled with tap-water and allow them to sediment to the bottom. In cases of massive infestations, eggs or oocysts may be collected in this manner for various purposes or the degree of parasitic infestation may be estimated.—A. KOTLÁN (BUDAPEST).

SERGENT, Ed., DONATIEN, A., PARROT, L., & LESTOQUARD, F. (1935). Au sujet de la classification des piroplasmes du boeuf. Le genre *Piroplasma* et son sous-genre *Babesiella*. **[The Classification of Bovine Piroplasms].**—*J. comp. Path.* **48.** 261-266. 2 plates, 2 tables, 10 charts. [5 refs.] [In French].

The authors adopt the classification of MESNIL, rejecting the name *Babesia* as it had been previously used for a species of bacterium. They assert that the generic name *Piroplasma* has been universally accepted by zoologists, microbiologists and veterinary surgeons. [This is incorrect, as it has been pointed out by WENYON, DU TOIT, HORNBY and others that, according to the rules of international nomenclature, the generic name should be *Babesia*, MESNIL'S objection to this name not being valid].

The position of the five species " *P. bovis* ", " *P. argentina* ", " *P. berbera* ", " *P. major* " and " *P. bigeminum* " is then discussed, and reliance is placed on the results of cross-immunity tests for proof of their specific individuality.

The creation of a sub-genus, *Babesiella*, is defended on the grounds that the four smaller organisms can be distinguished from the " *bigeminum* " type, both morphologically, by their size, shape and method of division, and biologically, by their reaction to treatment with trypan blue which is said to cause a rapid reduction of fever and a disappearance of parasites from the circulation in disease due to organisms of the " *bigeminum* " type, but to be without effect on any of the " babesiella ". In addition to differentiation by immunity tests, *B. bovis* can be distinguished morphologically from all the other organisms by its smaller size, and *B. major* can be distinguished from all other " babesiella " by its large size. In the summary of the classification, it is suggested that *Françaiella causica* and *F. colchica* of YAKIMOFF may be synonymous with *B. berbera* and *B. major* respectively.—U. F. RICHARDSON.

CORDIER, G., & MÉNAGER, J. (1935). Quatre années de prémunition antipiroplasmique en Tunisie. [**Four Years' Experience of Premunition against Piroplasmosis in Tunis**].—*Publ. Serv. Élevage, Tunis.* pp. 31. [5 refs.] Tunis : Imprimerie centrale.

In recording their experience of the control of bovine piroplasmosis in Tunis, the authors stress that, although satisfactory methods of treatment are available for the babesia infections, the disease is often recognized too late to apply them, whilst in the case of theileria infection " gonacrine " has only a limited value, and for anaplasmosis no treatment has proved efficacious.

For the conferring of premunity, two operations are necessary, the babesia and anaplasma inoculation being performed in the autumn and the theileria inoculation in the spring. The inoculation should only be carried out on young animals and the premunity should be reinforced by annual vaccination.

The premunity against the two babesia infections is produced by the inoculation of the blood of animals about three months after their recovery from an acute attack of the piroplasmosis concerned. Mild anaplasma infection is transmitted by the use of the blood of animals in the incubation period, but failures in transmission occasionally occur and the use of a strain of *Anaplasma centrale* has recently been adopted. For vaccination against theileria, the " kouba " strain of the parasite, which produces " blue body " infection but no recognizable blood invasion, is used.

From 1931 to 1934, immunization was performed without charge, and in the last year 1,186 cattle were vaccinated. In the autumn of 1934, a charge of Fr.20 a head was introduced and only 136 animals were dealt with.

It is claimed that, excluding an animal which was not in a fit state for immunization, only two cattle succumbed to the treatment over the four seasons under report, that the mortality in untreated controls was six times as great as that in vaccinated animals and that immunization operations did not create any fresh centres of infection.—U. F. RICHARDSON.

RICHTERS, C. E. (1935). Klinik und Prophylaxe der Piroplasmosen. [**The Clinical Symptoms and Prophylaxis of Piroplasmal Diseases**].—*Zlb. Bakt. I. (Orig.).* **135.** 119-135.

This article gives a brief account of the clinical symptoms and pathological anatomy of the principal diseases caused by piroplasms. It also gives an account of the measures which have been adopted in various areas to control piroplasmosis. [The article contains nothing original].—U. F. RICHARDSON.

STURMAN, M. (1935). **A Note on Acquired Immunity to** *Theileria annulata*.—*J. comp. Path.* **48.** 298-299. 2 tables.

This article records observations made in Palestine on the incidence of theileria infection in cattle during the years 1933 and 1934. 362 cases of theileria infection were observed, 174 cases being secondary infections and 188 cases being primary attacks. No deaths occurred in the secondary infections, whilst the mortality in primary cases was about 35 per cent. It is concluded that " an animal recovering from *Theileria annulata* may be reinfected within three years after recovery but the reinfection causes no mortality ".—U. F. RICHARDSON.

DOMINICI, D. (1935). Le infezioni da emoprotozoi endoglobulari dei bovini in Italia. [**Protozoan Endocorpuscular Parasites of Cattle in Italy**].—*Azione vet.* **4.** 217-223. [23 refs.]

This article gives a general account of the varieties of bovine piroplasmosis encountered in Italy. The most wide-spread and severe of these infections is that due to *Babesia bovis*. It is noted, in this disease, that the parasites are usually rare in the peripheral blood but present in large numbers in the kidney tissue and myocardium. *B. bigemina* infection is encountered sporadically in local cattle, but may cause severe disease in imported animals. *Theileria mutans* is present in certain districts, but does not appear to cause serious disease. Another species of *Theileria* is encountered in southern districts and on the islands. This organism causes severe disease, with high fever, marked depression, salivation, oedema of the joints and throat, enlargement of the lymphatic glands and blood-stained diarrhoea. It is believed that this theileria can be transmitted by blood inoculation, but it is not considered that this has been definitely proved. Anaplasma infection is also encountered in certain districts, associated with a febrile condition and marked anaemia.—U. F. RICHARDSON.

CARPANO, M. (1934). **Latent Haemoprotozoal Infections, Intercurrent and Recidivous Diseases. Observations and Researches on the Comparative Pathology.**—*Bull. Minist. Agric. Egypt.* No. 136. pp. 17. 9 figs. on 9 plates.

Latent infections are divided into two types, those which exist prior to the appearance of disease symptoms and those which are the result of previous diseases. The first type has been most commonly encountered in trypanosome infections and two cases are cited of dogs in which no symptoms resulted for eight months after inoculation with trypanosomes. The second type arises when a state of equilibrium is reached between the attack of the parasite and the resistance of the host. This equilibrium may be disturbed in favour of the host or the parasite. In the second case, the disturbance results in a relapse, of which the most frequent causes are adverse conditions or intercurrent diseases.

The author records the observation of relapses to infections with *Babesia bigemina*, *Theileria mutans*, *Th. annulata*, *Anaplasma marginale*, *Tryp. vivax*, *T. theileri* and *Spirochaeta theileri* in cattle infected with rinderpest ; to infections with *B. bigemina* and *Th. ovis* in cattle and sheep respectively affected with foot and mouth disease ; to *B. caballi* and *B. equi* in horses affected with horse-sickness, and to *Sp. gallinarum* and *Aegyptianella pullorum* in fowls infected with fowl plague.

One protozoal infection may also cause a relapse to a pre-existing latent infection of another protozoon, and bacterial diseases, such as anthrax and haemorrhagic septicaemia, have been observed to cause a recurrence of *Th. mutans* and *B. bigemina*. Strangles in young horses in Italy is almost invariably complicated by a relapse to piroplasmosis in districts in which piroplasms are endemic, and even

vaccination against strangles may cause a similar relapse. One case is recorded of the recurrence of *B. equi* in a horse subjected to a subcutaneous mallein test.
—U. F. RICHARDSON.

KNOWLES, R., & BASU, B. C. (1935). **A Blood-Inhabiting Spirochaete of the Guinea Pig.**—*Indian J. med. Res.* **22.** 449-468. 3 text figs., 4 figs. on 1 plate, 3 tables, 2 charts. [19 refs.]

This paper gives a detailed description of a blood-inhabiting spirochaete of the relapsing fever group, first encountered by HASSAN of the Lahore Veterinary College in the blood of a guinea pig in the course of surra investigations. The spirochaete gives rise to a febrile disease in the guinea pig and its course resembles that of avian spirochaetosis in the fowl. The mortality is about 31 per cent. Infection is transmissible from one guinea pig to another by blood inoculation, but the authors have not been able to cause infection by infected *Argas persicus*. It is presumed that some species of tick which has access to guinea pigs is the transmitting vector. The suggested name for this organism is *Spirochaeta cobayae* n.sp.
—GWILYM O. DAVIES.

DISEASES CAUSED BY VIRUSES.

TURNER, A. W. (1935). **Pleuro-Pneumonia Contagiosa Boum: the Staining of the Causal Organism in the Specific Lesions.**—*Aust. J. exp. Biol. med. Sci.* **13.** 149-155. 8 figs. [10 refs.]

The causal organism of bovine pleuro-pneumonia (*Borrelomyces peripneumoniae* Turner, 1935) can be readily demonstrated in sections of diseased tissue provided that a suitable fixative is used. Fixation in formol-saline, formol-Müller or Regaud's solution destroys the organism, but Bouin's fixative, absolute alcohol, Carnoy's fluid and the mercuric chloride group (especially Zenker's fixative) are suitable. Methylene blue, gentian violet, Giemsa's stain, and some other basic dyes stain the organism readily, but an adaptation of Mallory's phosphotungstic acid-haemotoxylin is recommended.

The organism is present in infected lungs, mostly in the relatively enormous mycelial phase. The easy demonstration of the organism in extra-cellular situations is considered to be another reason for rejecting it irrevocably from the filtrable viruses. The fact that the organism has not previously been demonstrated in sections is attributed to the wide-spread use of formalin as a fixative and to the traditional view that it belongs to the filtrable viruses.—W. I. B. BEVERIDGE.

TURNER, A. W., & CAMPBELL, A. D. (1935). **A Hitherto Undescribed Pathological Condition Associated with Pleuro-Pneumonia Contagiosa Boum: Inflammatory Oedema in the Epidural Space and Around the Sciatic Nerves.**—*Aust. vet. J.* **11.** 138-143. 2 figs. [1 ref.]

Lesions not hitherto recorded in contagious bovine pleuro-pneumonia have been found in eight cases of this disease. Seven of the cases were in animals under 15 months of age. Symptoms shown by these animals included swaying and unsteady gait of the hind legs. *Post-mortem* examination revealed inflammatory gelatinous oedema of the epidural space in the sacral region, with or without extension cranially to the middle thoracic region and peripherally along the sciatic nerves.

In four cases the causal organism of pleuro-pneumonia was cultivated from the lesions.—W. I. B. BEVERIDGE.

TANG, F. F., WEI, H., & EDGAR, J. (1936). **Further Investigations on the Causal Agent of Bovine Pleuropneumonia.**—*J. Path. Bact.* **42.** 45-51. 11 figs. on 2 plates, 1 table. [4 refs.]

In addition to the morphological forms of the causal agent of contagious bovine pleuro-pneumonia previously described by these authors [this *Bull.* **5.** 710.], two other rare forms have been encountered, namely, amoeboid and giant ring forms. Their significance is unknown.

Continuing their study of serum broth cultures, the authors state that, in the case of freshly isolated strains, colony formation can be seen by the dark field method, but that this is not the case with old laboratory strains. This supports their contention that there is a marked difference between the method of multiplication of old and fresh strains.

The organism was found to be resistant to direct ultra-violet radiation and to the photodynamic action of methylene blue. It has been cultivated in the chorio-allantoic membrane of chicken embryo, and in this connexion the authors point out the confusion which may arise with certain uncultivatable pseudo-pleuro-pneumonia forms which are to be seen in embryonic tissues.—G. O. DAVIES.

LAWRENCE, D. A. (1935). **Foot and Mouth Disease in Southern Rhodesia.**—*J. S. Afr. vet. med. Ass.* **6.** 253-262.

This article gives a brief outline of the history of the disease in Southern Rhodesia from 1931 to 1935. The source of the infection remained obscure ; it was apparently introduced twice during this period, in both cases breaking out in the same area. The virus from the second outbreak was typed at Pirbright, England, and found to be different from the virus causing the previous outbreak which had been an O type. The writer is inclined to support the idea of DAUBNEY [this *Bull.* **5.** 269.] in relation to the mutation of virus types. The low infectivity of the virus under Rhodesian conditions was in sharp contrast to its high virulence at Pirbright. The method adopted for combating the disease was the wholesale infection of in-contact cattle by intranasal injection of virulent blood with vesicle material, a cattle-free zone being established round the outbreak of about five to 20 miles.—E. M. ROBINSON.

TORRES, S. (1936). A febre aphtosa e o papel dos morcegos hematophagos na sua disseminação. (Nota prévia). [**Attempt to Transmit Foot and Mouth Disease by Vampire Bats. (Preliminary Note)**].—*Folha vet., Brazil.* **1.** 36-37. [English summary : abst. from orig.]

The virus of foot and mouth disease at a certain phase circulates in the blood stream, and it was thought possible that the vampire bat, *Desmodus rotundus*, attacking cattle during that phase, might transmit the disease from animal to animal, with or without self-infection. In experiments carried out by the author, using virus of unidentified type from a vesicle in a bovine infected naturally – the strain being highly active for pigs and guinea pigs, it was found that *D. rotundus* was not infected by inoculation of virulent lymph applied either intradermally to the pads of the feet or by scarification of the gums. Experimentally inoculated bats which did not fall sick did not [after an interval not stated] infect susceptible animals (young cattle and pigs) whose blood they sucked. A bat, having had its mouth polluted by virulent material, infected a pig three hours later ; 19 hours later its saliva, inoculated intradermally into the pads of guinea pigs, failed to set up infection. Bats sucking the blood of sick pigs were not infected but, 24 hours later, they were still carrying the virus on the pads and on the hairs of the abdomen. Other experiments are in progress,

GRANOUILLIT, F., & DO-VAN-VIEN. (1935). Note sur la réaction locale dûe aux injections de vaccin antipestique à pulpe (vaccin au toluène). [**The Local Reaction to Antirinderpest Tissue Vaccine**].—*Rev. vét., Toulouse.* **87.** 621-624.

The authors discuss the oedematous swellings produced by subcutaneous injections of antirinderpest tissue vaccines containing toluol, and record the development of urticarial symptoms in a cow which received a subcutaneous injection of antirinderpest serum, followed by an injection of a toluol vaccine. —U. F. RICHARDSON.

DELPY, L. (1935). Nouvelles modifications apportées à la méthode de préparation du vaccin antipestique formolé. Vaccin liquide et vaccin sec. [**New Modifications of Formolized Antirinderpest Vaccine. Dry and Liquid Vaccines**].—*Bull. Acad. vét. Fr.* **8.** 444-449. 1 table.

This article records further observations and experiments on the value of the dried tissue vaccine made from the solid residue left after filtering off the liquid vaccine from formolized rinderpest tissue pulp [see this *Bull.* **6.** 328]. This dried vaccine is said to produce immunity, which is protective for at least a year, within eight days of injection. By the utilization of the residual pulp, the amount of vaccine obtained from a given quantity of material is increased by 67 per cent. Emphasis is laid on the local reaction produced at the seat of inoculation and it is suggested that the solid vaccine particles, suspended in water for inoculation, have a similar effect to that of tapioca grains, and that the vaccine combines a rinderpest antigen with a non-specific stimulating substance.—U. F. R.

DEBELIC, S. (1935). Pastuvska zaraza (Exanthema cortale paralyticum) u Jugoslaviji. [**Vesicular Exanthema of Cattle in Yugoslavia**].—*Vet. Arhiv.* **5.** 536-539. 2 tables, 1 chart. [Abst. from German summary].

Official records for the years 1924 to 1928 show that during this period genital vesicular exanthema occurred in four departments only (between two and five districts and four and nine villages being affected). The other 29 departments were free during the whole period.

STEIN, C. D. (1935). **Infectious Anemia or Swamp Fever in Horses. A Review of the Bureau of Animal Industry's Investigations.**—*J. Amer. vet. med. Ass.* **87.** 312-324. 1 table. [9 refs.]

This paper is concerned entirely with the American form of equine infectious anaemia, the " swamp fever " of the United States of America. It reviews investigations undertaken at different times by that government's Bureau of Animal Industry. The paper is in two parts, the first devoted to the series of investigations which ended in 1916, and the second to those subsequent to 1928 when the study of the disease was resumed.

The following were the outstanding results of the work of the former period. The disease in America is one of low-lying and marshy pastures. Incidence is highest in wet seasons. The aetiological factor appeared to be similar to that of the European form. Fly transmission proved positive in regard to *Stomoxys calcitrans.* Experiments in transmission by direct contact or by the feeding of infected blood or urine failed. Horses and mules proved to be the only animals susceptible to natural or artificial infection. The course of the disease was much affected by outside influences, debilitating conditions contributing especially to its severity.

The investigations carried out after 1928 showed the disease to be existent in

17 states of the U.S.A. In a few of these it constitutes an economic problem of major importance. It assumes an acute form from May to August. Most losses occur then. In the remainder of the year it tends to run a chronic course.

The symptoms of both forms of the disease are reviewed. There is an account of some inoculation experiments, the results of which were similar to those obtained in the earlier years. The remainder of the paper is devoted to a study of Fulton's mercuric chloride test, which method of diagnosis proved to be non-specific, a positive result merely indicating the existence of anaemia, but not the presence or absence of the virus infection.—C. DAVENPORT.

OPPERMANN, T. (1935). Grundsätzliches zur Beurteilung des Kaninchen-infektionsversuches und der Sublimatprobe bei der Diagnose der ansteckenden Blutarmut der Pferde. [**Diagnosis of Equine Infectious Anaemia by Rabbit Inoculation and by the Sublimate Test**].—*Arch. wiss. prakt. Tierheilk.* **70.** 52-61. [Numerous refs.]

The methods of diagnosing equine infectious anaemia by the sublimate test and by the subinoculation of rabbits are reviewed. The author is of the opinion that a positive sublimate reaction is evidence of the existence of anaemia, but is not necessarily characteristic of a specific anaemia. However, a positive reaction indicates the possible existence of infectious anaemia and this diagnosis must then be confirmed by the inoculation of rabbits.—E. J. PULLINGER.

MOHLER, J. R. (1936). **The Present Status of Equine Encephalomyelitis in the United States of America.**—*N. Amer. Vet.* **17.** No. 1. 34-38.

The disease occurs in the Argentine, Russia, etc., and in at least 16 states of U.S.A. In the last country two immunologically distinct strains of virus exist. Clinically, a mild febrile disturbance is followed by some of the following symptoms :– anorexia, difficulty in mastication and swallowing, twitching or paresis of various muscle groups, drowsiness, an ataxic gait and hyperexcitability. Later the animal falls, to lie quietly or execute running movements or violent beating of the head. Death ensues in from several hours to a few days ; of the 2 to 70 per cent. survivors many are " dummies ". All proved cases have occurred in summer or early autumn, mostly on swampy ground or near lakes, etc. Experimentally, five species of mosquitoes may transmit the infection. The following measures are recommended :– isolation of infected and normal animals separately in screened quarters, the use of insect repellents on horses in the field, prompt disposal of dead animals, disinfection of stables and the use of specific antiserum. Prophylactically a formolized vaccine has proved useful.

[Equine encephalomyelitis in the sense understood here is a specific virus malady distinct from Borna disease. Three strains of virus similar in their effects on experimental animals, but distinct immunologically, are known. These are (a) the original Californian (" Western ") strain – MEYER (1932). *Ann. int. Med.* **6.** 645., with which is immunologically identical the Argentine strain – see this *Bull.* **5.** 716.; (b) the " Eastern " American strain – TEN BROECK & MERRILL (1933). *Proc. Soc. exp. Biol., N.Y.* **31.** 217., and (c) the Russian strain – see this *Bull.* **6.** 128.

It is premature to conclude that the outbreaks of encephalitis in France – see this *Bull.* **4.** 618., Yugoslavia – this *Bull.* **4.** 654., Czechoslovakia – this *Bull.* **4.** 655., India – this *Bull.* **5.** 17., and elsewhere are all due to the same virus, or indeed are all necessarily of virus origin. The form of equine encephalitis described by MOUSSU & MARCHAND – (1924). *Rec. Méd. vét.* **100.** 1. – apparently differed in many respects from the disease under consideration].

—E. WESTON HURST.

HURST, E. W. (1936). **Infection of the *Rhesus* Monkey (*Macaca mulatta*) and the Guinea-Pig with the Virus of Equine Encephalomyelitis.**—*J. Path. Bact.* **42.** 271-302. 14 tables, 2 charts. [Numerous refs.]

Infection in these animals reproduces with considerable fidelity what we know of the spontaneous malady in the horse ; it is divisible into visceral and nervous phases, the latter much less constant in the monkey than in the guinea pig. During the visceral phase, virus circulates in the blood in greater amount than is readily accounted for by its titre in the viscera or at the site of inoculation, suggesting growth either in the blood itself or in a tissue intimately related to the blood stream and forming only a small part by weight of the various viscera. In the monkey, nervous involvement occurs when the antibody response to the visceral infection is complete and, unlike guinea pigs, monkeys recovered from the latter are usually not immune to intracerebral inoculation of virus.

After inoculation into the leg, virus does not reach the central nervous system by the local peripheral nerves. On the contrary, there is evidence that, while circulating in the blood, virus passes out to the nasal mucosa and travels thence by the perineural lymphatics of the olfactory nerve to the subdural space. The evidence does not exclude a slow growth through the haematoencephalic barrier as an alternative method of infection of the C.N.S., but, in the monkey, virus does not pass directly from blood to cerebrospinal fluid.

In its behaviour, this virus is probably very like those of vesicular stomatitis, yellow fever and " louping ill ". All are " pantropic " yet are sufficiently different from such pantropic viruses as pseudorabies, B virus and herpes to warrant relegation to a separate group.

TABUSSO, M. E. (1935). Immunización contra la encéfalo-mielitis equina. **[Immunization against Equine Encephalomyelitis].**—*Bol. Direcc. Agric. Ganad., Lima.* **5.** 87-45. [7 refs.]

Equine encephalomyelitis [which the author says was Borna disease] appeared in Peru in 1931 or 1932, and has spread with alarming rapidity in the warmer zones. Contagion appears to have been more rapid in mules than in horses. Outbreaks have been confined to the warmer months, from November to April. There is as yet no evidence that the disease has made its appearance in the higher altitudes inland. In the later stages of the disease, streptococci and other organisms could be cultivated from nervous tissue, but these were clearly secondary to the virus. 100 per cent. of affected animals died in the more severe outbreaks, which brought the mortality in the centre affected to 50 to 80 per cent. of the horse population.

Therapeutic treatment appeared to be valueless, but the author claims success from prophylactic inoculation with formolized nervous tissue from infected animals. Results following the application of this treatment to 50 polo ponies are recorded. Mortality ceased within a few days, but in the absence of controls conclusions cannot be drawn. [The author's conclusions are more positive than those detailed in this abstract but the facts recorded in the text do not appear to warrant them].

—R. S. ROBERTS.

HURST, E. W. (1935). **The Neurotropic Virus Diseases. I. & II.**—*Lancet.* **229.** 697-702 and 758-762. [Numerous refs.]

This article is essentially a critical summary of the present position regarding the neurotropic viruses. It does not readily lend itself to abstraction, but should be consulted in the original. The main headings under which the subject is

discussed are as follows :– the lesions and their distribution, paths of infection, clinical differences between virus diseases, poliomyelitis, Landry's paralysis, herpes zoster, encephalitis lethargica, some other neurotropic virus infections, treatment with serum, serum prophylaxis, active immunization, post-infective encephalitis, causation of the demyelinating diseases, chicken pox, German measles and mumps.

There is an interesting section on treatment with serum. It is pointed out that, while antiviral sera may possess the advantages of ready availability and maximum effects, it is doubtful whether curative treatment is of value in virus diseases. The difficulty of preventing an attack of vaccinia by means of immune serum given after the virus is cited as an example. Mention is also made of the impenetrability of the blood-brain barrier which normally holds back antibodies. It is now generally recognized that, once a cell is infected, treatment with antiserum is probably useless.

Active immunization is possible in some diseases, of which rabies is an outstanding example. The chief disadvantage is the comparatively long time required to produce an immunity. The protracted incubation period in rabies permits the adoption of this procedure, but in diseases of an acute nature, such as poliomyelitis, it is useless to vaccinate a patient or animal which is already infected.—R. E. G.

REMLINGER, P. (1935). La rage dite de laboratoire. **[So-Called " Laboratory Rabies "].**—*Ann. Inst. Pasteur.* Rabies suppl. pp. 35-68. [17 refs.]

While it is admitted that, generally speaking, antirabic treatment is a safe procedure, occasionally a subject succumbs with symptoms of acute ascending myelitis and paralysis. In certain instances, the fixed virus has been recovered from the central nervous system of such individuals by the inoculation of rabbits with a brain emulsion. The number of such fatalities recorded in the literature is relatively small, but Remlinger is of the opinion that this does not represent the true position since, in all probability, numerous cases have not been published or have been misdiagnosed.

Several reasons are advanced for the occurrence of rabies under these circumstances, among which mention is made of the danger of the rupture and exposure of nerves if the injection is too rapid, and also the greater frequency of these cases when Högyes' dilution method is employed. The occurrence of autosterilization of the virus in the nervous tissue may explain certain instances of post-inoculation paralysis in which rabies virus has not been recovered.

The identification of the type of virus responsible for these accidents is discussed. It is suggested that usually a street virus and a fixed virus can be readily differentiated by injection into rabbits and dogs, but attention is drawn to the difficulty which may arise in the case of certain superpotent natural strains which have a short incubation period.—R. E. GLOVER.

REMLINGER, P. (1935). Pasteur et la rage de laboratoire. **[So-Called " Laboratory Rabies "].**—*Bull. Acad. Méd. Paris.* **113.** 13-27. [27 refs.]

In this article, Remlinger analyses a number of cases of paralysis in man, believed to be due to the fixed virus, which occurred in the early history of rabies vaccination. He considers that the data are insufficient to permit an opinion as to whether they resulted from the vaccine itself or from other causes. Attention is directed to the circumstances under which the fixed virus may become pathogenic for man. [This aspect of rabies vaccination has been covered in a former article by the same author – see previous abst.].—R. E. GLOVER.

ROCA, J. A. (1935). République Argentine. Loi No. 12906 attribuant un crédit pour la prophylaxie de la rage parésiante des bovins. [**Law for the Control of Rabies in Cattle, Argentine**].—*Bull. Off. internat. Epiz.* **11.** 375.

The Argentine Government has passed a law authorizing the Minister of Agriculture to spend 30,000 pesos (about £260 at par) on measures for controlling rabies in cattle in the territories of Misiones and Formosa, and in the province of Corrientes.—F. BULLOCK.

DE VERTEUIL, E., & URICH, F. W. (1936). **The Study and Control of Paralytic Rabies Transmitted by Bats in Trinidad, British West Indies.**—*Trans. R. Soc. trop. Med. Hyg.* **29.** 317-354. 15 figs., 4 plates, 7 tables, 5 maps. [6 refs.]

Rabies in Trinidad is of unusual type, in that almost all the human cases are paralytic [see this *Bull.* **1.** 285, and **3.** 699.] ; the vampire bat (*Desmodus rufus*) is there the chief, if not the only, vector.

Vampire bats, the sole mammals specialized to feed exclusively on blood, are readily maintained and bred in captivity, using defibrinated blood as food. The teeth are especially adapted for cutting, and the animal laps blood exuding from a wound inflicted on a warm-blooded animal, in the case of horses, cattle, etc., commonly on the shoulder or neck ; the prolonged contact (15 to 25 minutes) must result in heavy contamination of the wound with saliva, which may explain the frequency of paralytic rabies after bites by infected bats. Other distinguishing features from cohabiting fish-, flesh- and fruit-eating bats are enumerated. The digesting and resting places of the bats in hollow trees, caves, drains, etc., are readily recognized by the animals' tarry excrement. Though normally nocturnal, infected bats often bite in the daytime ; they may fly a mile or so to their victims.

The first evidence that rabies exists among bats in a new locality is increased frequency of biting ; animal mortality always precedes human, since men are less likely to be bitten until precautions have been taken to safeguard animals, or these have been largely destroyed. The disease tends to occur in epidemic form over periods of from one to ten weeks, and then to persist in endemic form for months or years ; a subsequent period of freedom may be due to local self-extermination of bats.

Negri bodies were detected in 9·4 per cent. of 566 *Desmodus* caught in " infected " areas. In " non-infected " areas, 1·9 per cent. of 210 brains were positive. Less commonly, fruit-eaters were found to be infected. The disease has been transmitted with brains of *Desmodus* bats to calves and a monkey, but never directly to dogs, and from *Artibeus* (fruit-eating) bats to a guinea pig, a rabbit and a calf. Dogs may be infected with passage virus, when they always develop paralytic rabies. From Brazil it is reported that *Desmodus* bats, though showing no symptoms of rabies themselves, may transmit the disease to cattle within one to four months of experimental inoculation.

Control measures at present in operation include a survey of *Desmodus* resting places, destruction of bats, protective inoculation and protection from bites, educational and propaganda work, and so on. Bats are best destroyed (1) by local application of strychnine to a wound, which serves the need of many bats night after night ; (2) by netting or shooting when driven from their resting places by fumigation, and (3) by poisoning in their resting places with a cyanogas A dust.

—E. WESTON HURST.

NIKOLIC, M. (1936). Beitrag zur Frage der Uebertragung der infektiösen Bulbär-Paralyse in der Natur. [**Natural Transmission of Aujeszky's Disease**].—

Vet. Arhiv. **6.** 31-42. [4 refs.] [Serbo-Croat summary : abst. from orig. in German].

A natural outbreak of Aujeszky's disease in dogs is described. In a household containing four dogs one died very suddenly showing dyspnoea and salivation. About two weeks later a second dog died, a diagnosis of Aujeszky's disease being made in this case. Three days later the third dog died, whilst the fourth remained healthy, as did a cat which was bitten by one of the dogs which died. The original infection came by direct contact with an infected cat. The portal of entry was considered to be the alimentary tract, and this theory was confirmed by subsequent investigation. The clinical aspects of this alimentary form of Aujeszky's disease are compared with those of an epidemic of unknown origin which occurred amongst human beings. It is considered that the two conditions showed striking resemblances.—E. J. PULLINGER.

GERLACH, F., & SCHWEINBURG, F. (1935). Experimentelle Untersuchungen über die Aujeszkysche Krankheit (Pseudowut). I. Mitteilung. **[Aujeszky's Disease. Part I].**—*Z. InfektKr. Haustiere.* **48.** 270-310. 17 figs., 8 charts. [Numerous refs.]

The clinical pictures seen in experimental Aujeszky's disease of the dog, cat, horse, bovine, pig, sheep, pigeon, fowl, monkey, rabbit, guinea pig, mouse and man are described. The paper is unsuitable for abstraction ; readers are referred to the original. The infected horse shows partial paralysis, lack of co-ordination of movement and the adoption of unphysiological attitudes. From the time of infection, patients show a rapid and uninterrupted loss of weight. The bovine commonly shows cramp and paresis of the muscles of the head and neck ; there is also rapid loss of weight. Artificially infected lambs show marked irritation of the skin, and they scratch continually. Pigeons and fowls show symptoms of uni- or bi-lateral paresis similar to those associated with fowl paralysis.—E. J. P.

PANISSET, L. (1935). Maladie d'Aujeszky. **[Aujeszky's Disease].**—*Rec. Méd. vét.* **111.** 853-890. 14 figs., 2 tables. [Numerous refs.]

A useful survey of all aspects of the infection. Mention is made of the differential diagnosis from rabies. The bibliography is comprehensive. The authority for particular statements is not always indicated and in consequence successive portions of the text sometimes appear contradictory.—E. W. HURST.

BURNET, F. M. (1936). **Inapparent (Subclinical) Infection of the Rat with Louping-Ill Virus.**—*J. Path. Bact.* **42.** 213-225. 8 tables. [10 refs.]

Intracerebral inoculation of " louping ill " virus in the rat produces no manifest illness. Of intranasal instillation the same is true, yet virus passes to, and multiplies in, the olfactory bulbs ; it rarely penetrates to other centres. Virus disappears eight to nine days later, coincidently with the appearance of neutralizing antibodies in the serum, and the rat is then refractory to further inoculation. With agenesia of the olfactory apparatus, infection may not follow intranasal inoculation, an argument for spread of the virus by the nerve fibres. The virus possibly multiplies in the nasal mucosa, and at an early stage the blood is irregularly infective. X-radiated rats are slightly more susceptible than normals ; splenectomy has no definite effect. The author sees in the peculiar susceptibility of the olfactory apparatus a phenomenon of survival value to both parasite and host ; in contact with a virus of average virulence the latter acquires, through subclinical infection, immunity against more virulent strains.—E. WESTON HURST.

PERDRAU, J. R. (1936). **The Australian Epidemic of Encephalomyelitis (X-Disease).**—*J. Path. Bact.* **42.** 59-65. 7 figs. on 3 plates. [10 refs.]

The X-disease seen in Australia in 1917 to 1918, 1922 and 1926 differed in many respects from the lethargic encephalitis then universally prevalent, and notably in the ease of transmission to animals. Following BURNET's suggestion, made in the light of subsequent discoveries, that the disease was " louping ill " [see this *Bull.* **5.** 490.], Perdrau re-studied CLELAND's original material. The wide-spread mononuclear encephalo-myelo-meningitis was most marked in the cerebral cortex of (six) human cases ; here, and in the subjacent white matter, areas of demyelination, or even of necrosis, occurred. In the cerebellum some Purkinje cells were undoubtedly destroyed, leaving intact the basket fibres. Similar changes were present in material from four sheep, two monkeys and one foal ; in the monkeys almost all the Purkinje cells were destroyed. Thus, as far as comparison is possible, the lesions closely resembled those in " louping ill ". In addition, the range of animals susceptible is similar in the two cases.

Against the view that X-disease is " louping ill " militate the following facts :- (1) the normal vector of " louping ill " (*Ixodes ricinus*) is unknown in Australia, but other ticks or insects may there be responsible ; (2) " louping ill " has not been recognized in Australia, and at the time of the X-disease epidemics no abnormal incidence of nervous disease was noted in sheep, and (3) X-disease proved fatal in 70 per cent. of cases ; of six cases of human " louping ill " [see this *Bull.* **4.** 729.], all have recovered.

Perdrau concludes that the virus of X-disease so closely resembles that of " louping ill " that at this stage differentiation is impossible ; he does not claim that they are one and the same.—E. WESTON HURST.

MACKENZIE, R. D., & FINDLAY, G. M. (1936). **The Production of a Neurotropic Strain of Rift Valley Fever Virus.**—*Lancet.* **230.** 140-141. [7 refs.]

In five years of laboratory passage, the Rift Valley fever virus has never shown neurotropic activity, even after intracerebral inoculation. But, as in the case of yellow fever in monkeys, serial intracerebral inoculation in mice, protected against its visceral action by intraperitoneal administration of immune serum, yields ultimately a " fixed " neurotropic strain. Inoculated intracerebrally or intranasally in unprotected mice, rats, field voles, ferrets and *rhesus* monkeys, this evokes a meningo-encephalomyelitis without liver damage. Intraperitoneally inoculated monkeys exhibit only a slight febrile reaction unless the brain is simultaneously traumatized ; adult mice inoculated intraperitoneally may develop encephalitis.—E. WESTON HURST.

FRANCIS, T., Jr. (1935). **Immunological Relationships of Strains of Filtrable Virus Recovered from Cases of Human Influenza.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 1172-1175. 1 table. [4 refs.]

This paper describes an investigation of the neutralizing capacity of sera from recovered ferrets, of horse serum prepared by ANDREWES, LAIDLAW and SMITH against the British strain of influenza virus, and of pig serum provided by SHOPE from recovered cases of swine influenza. They were tested against Philadelphia and Porto Rico strains of virus.

The results show that the Philadelphia, Porto Rico and English influenza viruses are immunologically identical, whereas the virus of swine influenza is serologically distinct.—GWILYM O. DAVIES.

MANNINGER, R., & BAKOS, M. (1935). A malacok hurutos-genyes tüdogyulladásának oktanáról, tekintettel a " Ferkelgrippe "-re vonatkozó újabb megállapításokra. [**The Aetiology of Catarrhal-Purulent Pneumonia of Piglets with Reference to Swine Influenza**].—*Allatorv. Lapok.* **58.** 125-129. 2 figs., 3 tables. [7 refs.]

Following a brief history of the progress of our knowledge on the aetiology of catarrhal pneumonia of piglets (piglet influenza) with particular reference to the recent findings of KÖBE [this *Bull.* **5.** 271.], the authors record investigations carried out to show the role of *Haemophilus influenzae suis* and to ascertain whether an ultravirus plays a part in the aetiology of this disease. The determination of the bacterial flora of the carcasses of 28 piglets affected with catarrhal or catarrhal-purulent pneumonia showed that *H. influenzae suis* occurs principally in acute or subacute cases, while in chronic cases it was found more rarely and always in association with other bacteria. In some acute cases *B. pyosepticus equi* was found alone. Experimental infections of healthy piglets with pure cultures of *H. influenzae suis* were, as in KÖBE's experiments, unsuccessful ; no disease followed intranasal inoculation of a saline emulsion of lung tissue of piglets suffering from pneumonia. The authors conclude that catarrhal pneumonia of piglets (" Ferkelgrippe ") is, at least in Hungary, a non-contagious disease in the aetiology of which neither a filtrable virus, nor *H. influenzae suis* nor other bacteria play a primary role.
—A. KOTLÁN (BUDAPEST).

ORCUTT, Marion L., & SHOPE, R. E. (1935). **The Distribution of Swine Influenza Virus in Swine.**—*J. exp. Med.* **62.** 823-826. 1 table. [7 refs.]

A series of eight pigs infected with swine influenza virus and *Haemophilus influenzae suis* were killed on either the third or fourth day after inoculation, and selected tissues were used for the inoculation of mice. The virus was found with regularity in the lungs, tracheal exudate and the turbinates. It was present in the bronchial glands in a low concentration in two of the animals only and was never found in the blood stream or other organs.—R. E. GLOVER.

MITCHELL, C. A., WALKER, R. V. L., & HUMPHREYS, F. A. (1935). **Swine Fever Studies together with a Note on Acute Swine Diseases.**—*Rep. vet. Dir. gen. Dep. Agric. Can. 1935.* pp. 44-67. 11 tables. [8 refs.]

The authors direct attention to five acute infections of swine, and a table is included which compares the clinical symptoms of swine erysipelas, infectious enteritis, swine plague, swine influenza and swine fever. A second table gives the *post-mortem* findings of each disease. A short account is given of the history of swine fever, and the work of Sir W. OSLER carried out in 1877 is quoted in some detail. The authors then go on to deal with their own study of an unusually virulent outbreak of swine fever in Canada. The secondary invaders, together with other factors, of each outbreak were studied and the results may be summarized by the following quotations from the paper :–

" There is a marked similarity regarding the clinical symptoms and the pathological changes found in the tissues of animals affected with swine erysipelas, infectious enteritis, haemorrhagic septicemia, and swine fever. . . .

" As has been demonstrated the *P. suisepticus* was found in pure culture in the blood taken from animals belonging to a certain outbreak, whereas in another outbreak only a few miles distant, the *S. suipestifer* was found in pure culture. Since the primary cause of each outbreak was proved to be the virus of swine fever it is evident that finding in the blood of animals of pure cultures of the pathogenic micro-organisms to which reference has been made was not proof that they played a primary etiological rôle in the infections. This emphasizes the fact that finding the causative agent of swine erysipelas, infectious enteritis,

or haemorrhagic septicemia is not proof that the animals are infected only with the organisms found. The outbreaks described and experimentally studied demonstrate the possibility and even probability of the bacterial agents playing but secondary rôles to the swine fever virus. Outbreaks of an acute infectious disease of pigs with a high incidence of infection, especially where there is a high mortality and even although the usual clinical and pathological picture of swine fever is absent, should be considered and dealt with as swine fever until the causative virus of this disease has been excluded by experimental studies.

" The *P. suisepticus* was found in pure culture in three of the [five] outbreaks studied while the *S. suipestifer* was found in one. . . . It is noteworthy, however, that there is no special or significant differences (as evidenced by the pathological findings . . .) between animals which harbour the *P. suisepticus* and *S. suipestifer* as secondary agents.

" Pneumonia, which is supposed to be a fairly constant symptom when infection by the *P. suisepticus* occurs, was not found more often in an outbreak of swine fever when this organism played a secondary rôle than in an outbreak in which the *S. suipestifer* played the secondary rôle.

" Apparently swine exposed to the swine fever virus together with the *P. suisepticus* are able to survive providing they have been adequately protected against swine fever. In the experimental case fever and other clinical manifestations of infection appeared as a result of invasion by the *P. suisepticus* but in the absence of a progressive swine fever infection, the animal's natural defense was able to combat the *Pasteurella* invasion.

" There appears to be considerable variation in the virulence of the virus of swine fever. No difficulty has been encountered in Canada up to the present in conferring temporary protection upon swine which have been exposed to the swine fever virus and which present normal temperatures. In the outbreaks described, the ordinary standard dose of antiserum failed to confer adequate protection upon exposed swine. Only larger doses gave complete protection. . . .

" An attack of swine influenza does not confer immunity against swine fever."

DEBELIC, S. (1935). Svinjska kuga (Pestis suum) u Jugoslaviji. **[Swine Fever in Yugoslavia].**—*Vet. Arhiv.* **5.** 566-570. 2 tables, 1 chart. [Abst. from German summary].

Official records for the years 1924 to 1928 show that swine fever occurred continuously or intermittently in every department of Yugoslavia during this period.

PENHA, A. M. (1934). Casos de peste dos porcos observados em São Paulo. **[Swine Fever in São Paulo].**—*Arch. Inst. biol. Def. agric. anim. S. Paulo.* **5.** 137-141. [4 refs.] [English summary : abst. from orig.]

Using material from pigs that had died in the course of an outbreak of swine fever in Brazil, the author carried out passage experiments in pigs, satisfying himself from the course of the experimental infection and the lesions in the animals that the virus was that of swine fever.

Pigs treated respectively with a serum and with a formolized virus, both obtained from Germany, were shown to be immune to the Brazilian virus.

BEARD, J. W., & ROUS, P. (1935). **Effectiveness of the Shope Papilloma Virus in Various American Rabbits.**—*Proc. Soc. exp. Biol., N.Y.* **33.** 191-193. [7 refs.]

The papilloma virus isolated from western cotton-tail rabbits (*Sylvilagus floridanus* Allen) readily infects New Jersey cotton-tails (*S. floridanus mallurus* Thomas), and less readily jack and snowshoe rabbits (*Lepus californicus* Gray and *L. americanus* Erxleben). In cotton-tails, in which the disease has been known for more than 50 years, the growths persist for months or years but nearly always retrogress. In domestic rabbits (genus *Oryctolagus*), a new host, they frequently progress to cancer, yet parasitism is aberrant in that only an attenuated virus is inconstantly recovered.—E. WESTON HURST.

I. SHOPE, R. E., & HURST, E. W. (1933). **Infectious Papillomatosis of Rabbits. With a Note on the Histopathology.**—*J. exp. Med.* **58.** 607-624. 9 figs. on 3 plates, 2 tables. [15 refs.]

II. SHOPE, R. E. (1935). **Serial Transmission of Virus of Infectious Papillomatosis in Domestic Rabbits.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 830-832. [3 refs.]

I. A papillomatous condition has been found affecting wild rabbits which, although not disturbing the general health of the animals, is a transmissible virus disease. The lesions of natural cases show a predilection for the inside of the thighs, the abdomen, the neck and shoulders, and have the form of black or greyish-black horny protuberances with fissured surfaces; section reveals a pinkish centre and grey edges. The condition was readily transmissible by scarifying saline suspensions of material from natural cases on to wild or domestic rabbits; in the former animals serial transmission was obtained. The experimental disease developed from minute elevations which appeared from six to 12 days after inoculation to solid masses of pink wrinkled keratinized tissue by the sixth week. Histologically, the experimental and natural lesions conformed in structure, and appeared to commence as localized epithelial thickenings which developed by proliferation into projecting papillae with connective tissue cores and keratinization. No epithelial inclusions were recognized. The virus readily passed Berkefeld filters, was viable in glycerin saline after at least 106 days in cold store and showed an unusual heat resistance. The sera of infected rabbits had a neutralizing action on the virus, and animals showed resistance to reinfection. There was no immunological relationship to infectious fibroma or infectious myxoma of rabbits.

II. Here it is reported that, after a number of failures, it has been possible to carry strains as far as the tenth passage in domestic rabbits. The incubation period is longer than in wild rabbits, and the type of lesion more isolated, similar to that produced when domestic rabbits are inoculated with very dilute wild rabbit virus. The breed of the rabbits, or the stage of maturity of the transfer material, appears to have no effect on the transmission possibility, but age may be an important factor, warts from rabbits over two years of age being more often transmissible than those from rabbits two to four months old. It is possible that after several serial passages an adaptation to the new host occurs.—NORMAN HOLE.

MCKENNEY, F. D., & SHILLINGER, J. E. (1935). **Infectious Myxomatosis of Domestic Rabbits.**—*J. Amer. vet. med. Ass.* **87.** 621-630. 2 figs. [8 refs.]

The article opens with a general survey of the clinical symptoms and pathology of infectious myxomatosis produced by the Californian virus. The incubation period was from eight to 11 days, in which respect this strain seemed to be slightly less virulent than those of South America. The disease was regularly transmitted by nasal or ocular exudates, and by small amounts of blood and tissues from infected animals.

Attempts were made to repeat the experiments of SHOPE [this *Bull.* **3.** 485.] on the production of immunity to myxoma virus by the use of the fibroma virus of the cotton-tail rabbit, but the results were indefinite. It was found that rabbits bearing actively growing tumours were often immune to myxoma, but those in which the tumours had retrogressed were usually not protected. In any case, it was noticed that, in spite of repeated animal passage, the fibroma tumour virus rapidly decreased in virulence. Serum from rabbits immune to myxoma neutralized the homologous strain *in vitro*, but failed to exert any curative action in the animal body.—R. E. GLOVER.

FORTNER, J. (1934). Ueber die Papageienkrankheit (Psittakose). [**Psittacosis**].—*Dtsch. tierärztl. Wschr.* **42.** 720-723. [8 refs.]

A systematic article on psittacosis. In 1930 LEVINTHAL, and COLES and LILLIE, working independently, discovered the causal organism in the pericardial fluid of an artificially infected parrot. LEVINTHAL named it *Microbact. multiforme psittacosis* and LILLIE named it *Rickettsia psittaci.* It is a barely visible organism measuring 0·2μ.

The white mouse is a suitable laboratory test animal, and the technique for its employment is given. Blood from human cases in the first three days of illness, sputum at any stage and the lung, liver or spleen of the carcass are suitable sources of material for diagnostic tests. Suspected parrots should be killed and sent immersed in a disinfectant.

The disease as it appears in man is described. Birds only show a complex syndrome of severe general illness, or may not appear to be ill at all.

Strong control measures for the conduct of aviaries containing parrots, parakeets, canaries, etc., have been instituted in Germany.

—W. VON DÜRING (WILMERSDORF).

DEBELIC, S. (1935). Ovče boginje (Variola ovina) u Jugoslaviji. [**Sheep Pox in Yugoslavia**].—*Vet. Arhiv.* **5.** 383-384 and 385-387. 2 tables, 1 chart. [Abst. from German summary].

During the period 1924 to 1928 the incidence gradually rose in 30 departments, while three departments remained free from the disease.

DORALP, S. (1936). Kus difteri ve çiçegi. [**Vaccination against Fowl Pox**].—*Askerî tibbi baytarî mecmuasi.* **13.** 291-304. [9 refs.] [Abst. from French summary].

The author obtained virus from a severely affected turkey and passaged it four times in pigeons during a ten-day period. With this passaged virus he inoculated affected fowls intracutaneously twice during a period ranging from seven to ten days with an 0·2 to 0·3 c.c. dose. Healthy birds in contact with the affected ones were given an 0·1 c.c. dose. The healthy birds were successfully immunized and the measures were successful in suppressing the infection.

PLOTZ, H. (1935). Essai de culture du virus de la peste aviaire en présence de cellules mortes. [**The Cultivation of Fowl Pox Virus on Dead Tissues**].—*C. R. Soc. Biol. Paris.* **120.** 848-849. [3 refs.]

The author attempted to cultivate the virus of fowl pox in tissue culture with cells which had lost their vitality by exposure to a temperature of 37°C. for 15 days. After two days' incubation, the cells carrying the virus were found to be dead. In the experiment carried out, two sub-cultures were made in medium containing cells killed by exposure and virus was found to remain alive for nine days. As virus in culture retains its activity for nine days at 37°C., the author concluded that no multiplication of virus had taken place in the presence of dead embryonic cells.—D. R. WILSON.

BIERBAUM, K. (1935). Ueber bipathogenes Taubenpockenvirus. [**Bipathogenic Pigeon Pox Virus**].—*Arch. wiss. prakt. Tierheilk.* **69.** 439-440. [4 refs.]

Two strains of virus were isolated from spontaneous cases of pigeon pox which differed from the stock laboratory strain of virus in regard to the nature of their pathogenicity for fowls.—E. J. PULLINGER.

I. PIRIE, Antoinette. (1935). **The Effect of Extracts of Pancreas on Different Viruses.**—*Brit. J. exp. Path.* **16.** 497-502. 2 tables. [8 refs.]

II. BAWDEN, F. C., & PIRIE, N. W. (1936). **Experiments on the Chemical Behaviour of Potato Virus " X ".**—*Ibid.* **17.** 64-74. 5 tables. [11 refs.]

I. The inactivation of vaccinia and of Fujinami fowl tumour viruses and the inhibition of the lactic dehydrogenase of pleuro-pneumonia by extracts of pancreas are not due, as has been assumed, to trypsin. Northrop's crystalline trypsin, chymotrypsin and chymotrypsinogen have little or no effect ; but fatty acids and lecithin prepared from dried pig pancreas and other sources, or obtained commercially, are definitely virucidal, possibly from surface action on the virus. Of the higher fatty acids, only unsaturated ones are effective. The varying fatty acid and lecithin content of active trypsin preparations may thus explain conflicting statements on the inactivation of viruses by trypsin.

II. Unlike tobacco mosaic and certain animal viruses, potato virus " X " is rapidly inactivated by crystalline trypsin, as also by crystalline pepsin and by papain + KCN. Other chemical properties are described.—E. WESTON HURST.

HOLDEN, Margaret, & STRONG, P. S. (1935). **An Attempt to demonstrate Local Formation or Concentration of Virucidal Antibodies.**—*Proc. Soc. exp. Biol., N.Y.* **33.** 144-146. 1 table. [4 refs.]

The tissue juices extracted from a skin area inoculated weekly for four to six weeks with herpes virus never neutralized the virus, though the blood serum neutralized in a dilution of 1 : 4. This is contrary to the findings of other workers in the case of bactericidal substances.—E. WESTON HURST.

MANNINGER, R. (1935). **General Aspects on the Properties of the Ultraviruses (Filtrable Viruses).**—*12th Int. vet. Congr. 1934.* **1.** 207-228. [French, German and Spanish summaries]. [Hungarian version appears in *Allatorv. Lapok.* **57.** 239-245.]

This article is a general review of the present position regarding filtrable viruses. Special attention is directed to the size, filtrability and cultivation of viruses, and their relationship to secondary organisms.—R. E. GLOVER.

GERLACH, F. (1935). Neue Untersuchungen über Filtrierbare Virusarten. [**New Investigations on Filtrable Viruses**].—*12th Int. vet. Congr. 1934.* **1.** 228-262. [English, French and Spanish summaries : abst. from orig. in German]. [Also appeared in *Wien. tierärztl. Mschr.* **22.** 385-395 and 417-425].

A review of the nature of filtrable viruses and their cultivation and methods of immunization with particular reference to rinderpest, contagious bovine pleuro-pneumonia, foot and mouth disease, vesicular stomatitis, malignant bovine catarrh, infectious bronchitis of horses (Hoppegarten cough) and of cattle, infectious anaemia in domestic animals, Borna disease, equine encephalomyelitis, African horse-sickness, swine fever, swine influenza, blue tongue, " louping ill ", rabies, including the paralytic type in cattle in South America, Aujeszky's disease, fowl plague, fowl paralysis, fowl leucosis, laryngotracheitis, psittacosis, pox diseases, and myxomatosis in rabbits.—J. E.

BURNET, F. M. (1936). **Inapparent Virus Infections with Special Reference to Australian Examples.**—*Brit. med. J.* Jan. 18th. 99-103. 1 table. [10 refs.]

With recent observations on poliomyelitis, yellow fever, " louping ill " (possibly identical with Australian X-disease) and psittacosis as text, the author

stresses the importance of the modern ecological outlook in epidemiology. A virulent virus will probably soon be eliminated through progressive decrease of susceptible hosts. But where, as is often the case in psittacosis, the virus is of high infectivity but of low virulence, inapparent infections are common, and the equilibrium necessary for survival of both virus and host is established. The relative non-susceptibility of young subjects is a clear adaptation to allow survival until specific adult immunity is developed. Successful efforts to disturb the ecological equilibrium to the advantage of the vertebrate host may have unexpected consequences, and the safest procedure will probably be the imitation of the natural source of protection – the inapparent infection.—E. WESTON HURST.

FARNY, J. (1935). Beeinflussung des qualitativen Blutbildes beim Schafe durch Impfung mit lymphadenotischem Material vom Rinde. **[Influence on the Blood Picture of Sheep of the Injection of Material from Cattle affected with Lymphadenosis].**—*Inaug. Diss., Berlin.* pp. 32. 4 tables. [Numerous refs.]

Experiments indicate that the injection of sheep is of no value for the diagnosis of bovine leucosis.—E. J. PULLINGER.

BOYNTON, W. H. (1935). **Immunization against Virus Diseases with Tissue Vaccine.**—*J. Amer. vet. med. Ass.* **87.** 650-660. [19 refs.]

Boynton is of the opinion that a permanent immunity to a virus disease can only be induced either as a result of recovery from unmodified virus or from the effect of potent virus given in conjunction with hyperimmune serum. For this reason, it is unwise to expect a high degree of immunity from tissue vaccines, or to assume that one dose will be sufficient. It is suggested that, in respect of these vaccines, the term " resistance " is more appropriate than " immunity ". Tissue suspensions, however, have the great advantage that they are much safer in the field. The author believes that killed virus is incapable of inducing a useful immunity, and suggests that the good results obtained with treated tissues are referable to the modifying effects exercised by an attenuating agent on a living virus.

For the production of efficient tissue vaccines, the two main requirements are (1) that the tissues should be obtained from animals killed at the height of the disease, and (2) that only those organs containing the virus in highest concentration should be used. These general principles are illustrated by reference to rinderpest, swine fever and dog distemper.

In the discussion which followed KELSER put forward the view that, whilst it may be possible to grow viruses artificially on a large scale, the immunity produced by them might not be so good as that resulting from tissue vaccines. He thought that the tissues themselves played a part in the production of immunity. He believed that killed virus emulsions were of antigenic value provided that sufficiently large doses were given.—R. E. GLOVER.

PARASITOLOGY (ARTHROPODS IN RELATION TO DISEASE).

UNITED STATES OF AMERICA, MICHIGAN. (1931-1933). **Reports of the Entomology Section for the Years ended June 30th, 1931, 1932 and 1933.** [PETTIT, R. H.]—*Rep. Mich. Bd Agric. 1931, 1932, 1933.* pp. 253-272, 217-239 and 225-235. 58 figs.

In the 1931 report the only reference of veterinary interest is to *Cephenomyia phobifer*, the nose-fly of deer. An attempt to treat two deer by an injection into

the nostrils of a 20 per cent. solution of chloroform in milk failed to dislodge the larvae.

The 1932 report is confined to plant and grain pests, but in the 1933 report there is a brief mention of preliminary experiments with a 25 per cent. pyrethrum powder being used successfully against cattle lice and sheep ticks. The matter is dismissed in six lines and no details of the experiments are given.—J. S. STEWARD.

MACKERRAS, I. M. (1935). **Sheep Blowfly Investigations: Observations on the Mules Operation.**—*J. Coun. sci. industr. Res. Aust.* **8.** 169-170. [1 ref.]

This note records some observations on the surgical removal of skin wrinkles from the crutch of ewes in order to reduce their susceptibility to blowfly strike (the Mules operation). The sheep stood the operation well and the wounds healed readily. When examined two to three weeks after the operation only 12 per cent. of the treated sheep were classified as having wrinkly crutches, as compared with 65 per cent. in the untreated ones. This indicates that the operation is definitely of value in preventing strike.—W. I. B. BEVERIDGE.

BISSELL, T. L. (1935). **The Screw Worm.**—*Bull. Ga Exp. Sta.* No. 189. pp. 11. 5 figs.

The writer describes the "screw worm" (*Cochliomyia hominivorax*) and gives an account of its life-history and methods that may be adopted for its control. The paper is apparently written for the benefit of stock-owners.

The life-cycle of the parasite takes from nine to 21 days, the eggs hatching in less than 12 hours and the larvae feeding in the wound for five to six days; from three to 14 days are passed in the ground before the larvae hatch into adults.

Under favourable conditions there may be as many as nine or ten generations in one year. Among the recommendations for control are steps to prevent open lesions and dressing of wounds during the summer, and the destruction of all carcasses as soon as possible after death.—J. S. STEWARD.

NASH, T. A. M. (1934). **The Identification of the Three Commonest Species of Nigerian Tsetse Fly.** pp. 2. 1 plate. Lagos: Survey Dep. [8vo]. [Copied *verbatim* from *Rev. appl. Ent.* **23.** 173].

A brief popular key is given for the identification of living or freshly killed examples of *Glossina palpalis*, R.-D., *G. tachinoides*, Westw., and *G. morsitans*, Westw., for use in that part of Nigeria north of 9°N.Lat., where only these three species occur. For places further south the key is not accurate, but may still be used for differentiation between the first two.

DIESEL, A. M. (1935). **The Control and Eradication of Ticks in South Africa with Particular Reference to the Province of Natal.**—*J. S. Afr. vet. med. Ass.* **6.** 263-269.

NICOL, J. (1935). **A Short Note on the Control and Eradication of Ticks in the Cape Province.**—*Ibid.* 270-273.

Diesel mentions that until the arrival of East Coast fever in South Africa no interest was taken in tick eradication. Most South African ticks belong to disease-transmitting species and, for this reason alone, an attempt should be made to eradicate them. The various methods of tick eradication are discussed, and the opinion is expressed that total eradication would prove impossible for many years under the present farming conditions and on account of the numerous wild animal and bird hosts of ticks. As the state of premunition in tick-borne diseases is being maintained by tick infestation, total eradication may be undesirable. Research

work should be directed towards finding less dangerous tick-destroying preparations than the arsenical ones.

Nicol deals mainly with the history of the control measures for tick eradication adopted in the Cape Province. Legislation in this connexion was introduced in 1908, but compulsory dipping was only enforced in 1912 when East Coast fever broke out. An instance is given of the great increase in land values resulting from tick eradication in a badly infested coastal area farm. Relaxation of control measures always results in a recrudescence of tick-borne diseases. Nicol does not recommend the non-dipping of calves on farms in order that they may grow up immune to redwater and anaplasmosis.—E. M. Robinson.

Macleod, J. (1935). *Ixodes ricinus* **in Relation to its Physical Environment. III. Climate and Reproduction.**—*Parasitology.* **27.** 489-500. 2 figs., 5 tables. [15 refs.] [For abst. of previous article in this series, see this *Bull.* **6.** 137].

This is the third of a series of laboratory studies on the relation of *I. ricinus* to its physical environment. The present paper deals with the relation of climate to reproduction, including development of the egg.

The humidity factor is much more important than the temperature factor in the control of reproduction. The total possible egg output of the ovary appears to be directly controlled by the humidity and, furthermore, the subsequent fate of the egg is considerably influenced by the humidity conditions at the time of oviposition.—J. S. Steward.

Sugimoto, M. (1934). **On a New Species of Mallophaga** (*Philopterus kozuii*) **Parasitic on the Duck (Khaki-Campbell), and** *Lipeurus heterographus* **Nitz.** —*Taiwan no Chikusan.* pp. 10. 5 figs. [In Japanese]. [Copied *verbatim* from *Rev. appl. Ent.* **23.** 175].

In central Formosa, this duck is severely injured by *Philopterus kozuii*, sp.n., the female of which is described. The lice occur round the eyes and kill over 5 per cent. of the young birds or 60 per cent. of those infested. The native ducks are also attacked, but are only slightly injured. A description is also given of *Lipeurus heterographus*, Nitzsch, with notes on the injury it causes ; it has not been found in Formosa, but is likely to be introduced from Japan.

Sugimoto, M. (1934). **Supplementary Report on the Head Mallophaga of Poultry.**—*Taiwan no Chikusan.* pp. 9. 5 figs. [In Japanese]. [Copied *verbatim* from *Rev. appl. Ent.* **23.** 175].

Lipeurus denticlypeus, sp.n., collected on the neck and head of a hen, is described from Formosa. In the original the name *dentatus* was given, but it is corrected to *denticlypeus* in the reprint.

PARASITOLOGY (DISEASES CAUSED BY HELMINTH PARASITES).

Galli-Valerio, B. (1935). Parasitologische Untersuchungen und parasitologische Technik. **[Parasitological Investigations and Parasitological Technique].**—*Zlb. Bakt. I.* (*Orig.*). **135.** 318-327. 3 figs. [3 refs.]

This paper represents a catalogue of the parasites found in some 77 wild and domestic birds and animals. Among the parasites of veterinary interest may be mentioned the following :—*Prosthogonimus pellucidus* in the fowl, *P. ovatus* and *P. cuneatus* in the crow, and *Dicrocoelium lanceolatum* in the rabbit and the hare.

The author has found this parasite very frequently in the hare; he considers *Zebrina detrita* var. *radiata* as a very probable intermediate host. Fatalities in sheep were observed in association with young *Cysticercus tenuicollis*; dark red flecks and lines were observed in the lungs and liver. One or two notes are also given on some of the methods which Galli-Valerio has used in preparing his specimens.—E. L. TAYLOR.

PINTO, C., & DE ALMEIDA, J. L. (1935). Sinopse dos helmintos animais domesticos do Brasil. [**Helminth Parasites of Domestic Animals in Brazil**].—*Campo, Rio de J.* **6.** No. 8. 54-63. 10 figs. [Numerous refs.]

This paper is based on publications by TRAVASSOS of the Oswaldo Cruz Institute. Attention is called to the importance of echinococcus infection in Brazil, and the authors urge that this disease should be scheduled. A list is given of the helminth parasites which have been identified up to the present time in each of the common domestic animals.—R. S. ROBERTS.

PINTO, C. (1935). Variaçoes morfologicas observadas no " Eurytrema fastosum " (Kossack, 1910). [**Morphological Types of** *E. fastosum*].—*Campo, Rio de J.* **6.** No. 10. 50-52. 10 figs. [13 refs.]

The author adduces evidence to show that the two platyhelminths of the cat, hitherto assigned to the genera *Eurytrema* and *Platynosomum*, are one and the same parasite, confusion having arisen through the fact that in some specimens there is rupture of the testes with disappearance of the contents. He assigns the parasite to the genus *Eurytrema* (*E. fastosum* Kossak, 1910).—R. S. ROBERTS.

DAVOR, M. (1936). Parazitički nematodi u debelom crijevu nasih konja. [**Nematode Parasites of the Large Intestines of Horses in Yugoslavia**].—*Vet. Arhiv.* **6.** 43-68. 3 tables. [16 refs.] [Abst. from English summary].

The author gives a list of helminth parasites found in the large intestine of 27 horses examined *post mortem* in Zagreb and the vicinity. Those most frequently found were:- *Trichonema nassatum*, *T. longibursatum*, *Strongylus vulgaris*, *S. edentatus*, *T. calicatum*, *T. catinatum* and *T. coronatum*. The ratio of male to female worms varied from 1 : 1.08 to 1 : 4.3. None of the intestines examined was quite free from helminth parasites.

OXSPRING, G. E. (1936). **Equine Debility due to Trichostrongylus axei.**—*Vet. Rec.* **16.** 87-88.

This is a short note on a pathological exhibit, namely, part of the pyloric portion of the stomach of a horse destroyed on account of debility. The cause of the condition was not diagnosed during life. The specimen showed a greatly inflamed mucosa with corrugations, haemorrhages and a sticky mucous covering. *T. axei* was demonstrable in scrapings taken from the lining membrane. The author considers that the condition of this horse in life and the gastric alterations found *post mortem* must be ascribed to the presence of this parasite.—C. DAVENPORT.

BUCKLEY, J. J. C. (1935). **Some Observations on** *Necator suillus* **Ackert and Payne, 1922.**—*J. Helminth.* **13.** 67-76. 1 fig., 2 tables. [8 refs.]

ACKERT and PAYNE, when they created the species *N. suillus* of the pig, correctly regarded it as a distinct species. There is no truth in the suggestion that *N. suillus* is merely a smaller form of *N. americanus* of man, resulting when the latter species occasionally occurs in the pig as an abnormal host.

N. suillus can be distinguished from *N. americanus* by the characters of its

oral papillae, mouth armature and dorsal bursal rays, as ACKERT and PAYNE pointed out. The telamon of *N. suillus* is smaller and the tips of its prongs approach each other closely or almost touch, while those of the larger telamon of *N. americanus* are widely separated. The cuticle of the dorsal surface of *N. suillus*, just in front of the bursa, has seven to 12 transverse ridges and its spicules have a " kink ", which is illustrated, both these features being, perhaps, the result of dorsal bending during copulation.

Statistical analysis of measurements of the body lengths, tail lengths and spicule lengths of 30 females and 50 males shows that the females of the two species can be reliably distinguished by their body lengths, *N. suillus* being shorter, and that males can be distinguished by their spicule lengths, those of *N. suillus* being shorter.

If *N. suillus* were merely a form of *N. americanus* occurring occasionally in the pig as an abnormal host, it would not be common in pigs and it would reassume the characters of *N. americanus* in human beings infected with it. The author, however, found it common in Trinidad pigs, some containing as many as 700 specimens ; and GOODEY has shown that it is almost impossible to infect pigs with *N. americanus*. When the author infected human beings with infective larvae of *N. suillus*, cultivated from uterine eggs of this species on sterilized pig's faeces and sterilized soil, the worms recovered by anthelmintic treatment from the human patients had retained the characters of *N. suillus* and had not any of the characters of *N. americanus*.—G. LAPAGE.

CENA, M. R. (1935). Przczynek do rozpoznawania wlosnicy u swin zapomoca odczynu stracania. [**Diagnosis of Trichinosis in Pigs by Precipitation Reaction**].—*Przegl. wet.* **48.** 302-313. 5 tables. [5 refs.]

TRAWINSKI and MATERNOWSKA's investigations on the diagnosis of trichinosis in pigs by the precipitation reaction revealed that Bachman's trichina antigen, containing carbolic acid, sometimes gives positive results in cases free from trichina infestation. The author used Trawinski's antigen and, with six experimental and 200 control swine, showed the precipitation reaction then to be distinctly specific. It is possible by this method to diagnose trichinosis in swine on the 11th day after infestation. Well-defined results are obtainable one month after infestation.—K. SZCZUDLOWSKI (Lwów).

TRAWINSKI, A. (1934). Biologische Untersuchungensmethoden zur Feststellung der Trichinose bei Schweinen. [**Biological Diagnosis of Trichinosis in Swine**].—*Berl. tierärztl. Wschr.* **50.** 223-224. [1 ref.]

For the biological diagnosis of trichinosis the author prepared an antigen as follows :–

Rabbits are infected by the mouth with trichinae and 20 days later are killed and their masticatory muscles are cut up, minced and placed in a petri dish containing 20 c.c. of sterile 0·04 per cent. of pepsin and 0·25 per cent. of HCl, the mixture being kept for 2 to 3 hours at 42°C. By this means the young unencapsulated trichinae escape into the fluid and, when present in suitable numbers, are dried in a desiccator for three or four days, ground up and mixed with sterile normal saline in a dilution of 1 : 500. This constitutes the antigen which is used for the intradermal test in living animals.

Tests on dogs gave good results. Four to eight hours after the injection a soft red weal forms and increases during the following 10 to 15 hours to a diameter of 15 to 30 mm., then gradually disperses in the next eight to 12 hours.

Precipitation tests with blood serum and the same worm antigen are also

described. All pigs which were artificially infected gave positive results to this test between the 11th and 60th days after infection. The reaction takes place in the course of 20 minutes to three hours.—J. E.

IMMUNITY.

NICOLLE, C. (1935). Propositions pour une dénomination plus précise en français des états et faits concernant l'immunité. [**Proposals for a Clearer French Nomenclature for Immunology**].—*Rev. Immunol.* **1.** 269-275.

NICOLLE, C. (1935). Propositions générales pour une dénomination plus précise en français des états et faits concernant l'immunité. [**Proposals for a Clearer French Nomenclature for Immunology**].—*Arch. Inst. Pasteur Tunis.* **24.** 513-519. [1 ref.]

NICOLLE, C. (1935). Propositions particulières de réforme de quelques termes impropres employés en médecine expérimentale. [**Suggestions for the Improvement of Several Terms used in Experimental Medicine**].—*Ibid.* 520-524.

There is great laxity in the use of French terms relative to the various states, phenomena and processes of immunity, with a consequent grave confusion. There is urgent need for a more precise technical terminology and this is illustrated by the multitude of meanings of the key-word " immunity ". The author proposes the following qualifications of its meaning :–

(1) *Immunité essentielle ou naturelle.*—A natural refractory state of a species of animal to an agent which is infectious or toxic for other species of animal.

(2) *Immunité acquise.*—This term embraces all other states of immunity and is subdivided by the author into :–

(a) *Immunité héréditaire.*—An immunity dating from conception and passing from either or both parents to the new-born animal.

(b) *Immunité congénitale.*—This may arise through the new-born animal having acquired either an infection – probably the most frequent cause – or a passive immunity *in utero.*

(c) *Prémunité.*—This state applies to certain infections in which the causal agent remains alive in a harmless or almost harmless form. It ceases if the pathogenic agent leaves the host.

The author proposes specific terms relative to natural, naturally acquired and artificially acquired states of immunity, and also to naturally acquired and artificially acquired states of premunition as follows :–

Immun : the state of natural immunity.

Immunir, *Immunit*, *Immunition* : relative to immunity from a naturally acquired disease.

(3) *Immuniser*, *Immunisé*, *Immunisation* : relative to the state of immunity following an artificial method.

(4) *Prémunir*, *Prémunit*, *Prémunition* : relative to a naturally acquired state of premunition.

(5) *Prémuniser*, *Prémunisé*, *Prémunisation* : relative to an experimentally acquired state of premunition.

He proposes that the occurrence of the word *inoculation* in a sentence should imply in advance the administration of a living pathogenic agent and that *injection* should be used for all other agents. He objects to the word *polyvalent* as being a mixture of Greek and Latin and having two meanings. He proposes the word *multivalent* for a mixture of two or more species of bacteria and the word

polyethnique for a mixture of two or more strains of the same species of bacteria.

The author then proposes the following more precise expressions for faulty ones in common use :–

Bacterial *suspension* for bacterial *émulsion*.

Inframicrobe for *ultra virus* and *ultra microbe*.

The word *sérum* has been employed in French with no relationship to blood, *e.g. serum physiologique* for normal saline. The author proposes its substitution by the word *eau* in all such cases, *e.g. eau physiologique*.

Oculoréaction for *ophthalmoréaction*.

Words with the radical *mun e.g. immuniser*, etc., for the terms *vaccin*, *vacciner* and *vaccination* for prophylactic purposes.

The author suggests a more limited use of the terms *typhus*, *typhique* and *paratyphique* with more precise substitutions as follows :–

Typhus only to be used for exanthematic typhus. *Typhique* only to be used in relationship with typhus. *Fièvre récurrente* for *typhus récurrent*.

Fièvre typhoïde for *Salmonella typhosus* infection.

Fièvre paratyphoïde for *paratyphique*.

The author criticizes the use of many terms of similarity such as *paratyphoïde*, *pseudotuberculose* and *dysenteriforme* which are often very misleading and only in temporary use. He proposes to offer more precise technical terms as substitutes in later articles.—C. V. Watkins.

Rossi, V. (1935). Il mezzo di Fronin nella preparazione dell' " esotubercolina " (E.T.F.). [**Preparation of Exotuberculin in Fronin's Medium**].—*Profilassi*. **8.** 20-23. [13 refs.] [French and German summaries : abst. from orig.]

Exotuberculin prepared from human and bovine strains of *Mycobact. tuberculosis* grown in Fronin's medium has been tested on tuberculous cattle. It proved to be suitable both for the subcutaneous and the intradermal tests and to be as active as exotuberculin prepared from bacilli grown in Sauton's or Long's media. The author claims that the advantages of using Fronin's medium are that it is cheap, easy to prepare and of known composition.—J. A. Nicholson.

Martinez, C. R., & de la Villa, G. C. (1935). Contribución al estudio de la exotuberculina de Finzi. [**Study of Finzi's Exotuberculin**].—*Trab. Inst. Biol. anim. Madr.* **2.** 305-329. 13 figs., 8 tables, 2 charts. [52 refs.] [Also appeared in *Rev. Hig. Sanid. pecuar.* **25.** 169-185].

Finzi's exotuberculin, now known as E.T.F., is a culture on peptone broth containing 5 per cent. glycerin, filtered through paper and formolized in the proportion of 5 : 1,000. The filtrate contains the unaltered exotoxins of the tubercle bacillus and may be used 24 hours after preparation. The originator claims greater specificity and activity for E.T.F. owing to the fact that it is not subjected to heat during preparation, both the thermostable and thermolabile elements being thereby preserved.

A comparison between E.T.F. and the standard tuberculin, by experiments on guinea pigs, gave the following results :– (1) E.T.F. shows from 6 to 16 times less toxicity in tuberculous guinea pigs ; (2) the focal reactions of E.T.F. are less intense ; (3) E.T.F. is harmless to healthy guinea pigs in relatively large doses (10 c.c.) ; (4) the temperature reaction to E.T.F. remains high for a longer period than in the case of the standard tuberculin, while the earliness and intensity are similar for both ; (5) E.T.F. is as active as the standard tuberculin in the case of the intradermal test, and (6) guinea pigs infected with advanced tuberculosis

showed a higher and more sustained reaction with E.T.F., and the cutaneous reaction was much more intense.—NORMAN BISSET.

BOYD, W. C., & TAYIAN, Elizabeth H. (1935). **A Note on the Capacity of Boiled Erythrocytes to Remove Agglutinins.**—*J. Immunol.* **29.** 511-513. 2 tables. [4 refs.]

Experiments with boiled human and chicken erythrocytes appeared to indicate that boiling almost completely destroys the capacity of the agglutinogens M and N to react specifically with their agglutinins. To demonstrate this point clearly it was necessary to work with antisera from which all non-specific anti-human erythrocyte agglutinins had been absorbed with fresh human cells, because the boiling of the test cells increased their non-specific, whilst destroying their specific, absorptive power.—E. J. PULLINGER.

HABS, H., & SIEVERT, Lena. (1935). Serologische Differentialdiagnose zwischen Abortus- und Melitensisinfektion des Menschen. [**Serological Differential Diagnosis between Human** *abortus* **and** *melitensis* **Infections**].—*Dtsch. med. Wschr.* **61.** 1398-1400. 3 tables. [9 refs.] [Copied *verbatim* from *Bull. Hyg., Lond.* **11.** 79. Signed J. C. CRUICKSHANK].

It is known that the antigenic relation of *Br. abortus* and *Br. melitensis* is such that the major antigen of each organism is identical with the minor antigen of the other, and that by careful quantitative absorption of the corresponding antisera by the heterologous organism a monospecific serum may be obtained. The authors have applied this principle to the examination of the sera of patients, by absorbing two samples of serum in a 1/50 dilution with suspensions of known smooth strains of *Br. melitensis* and *Br. abortus* respectively. The suspensions are standardized by opacity and correspond to 5,000, 20,000 and 40,000 million *Bact. coli* per cc. of serum dilution, the heavier suspensions being used in the event of the lighter not giving a clear-cut result. The patient's serum, after absorption by the infecting organism, failed to agglutinate either *Br. abortus* or *Br. melitensis*, whereas absorption with the other organism left residual antibodies capable of agglutinating the organism responsible for the infection.

PAARMANN, E. (1936). Feststellung der Eutertuberkulose durch Komplementbindung und Tierversuch. [**Diagnosis of Udder Tuberculosis by Complement-Fixation**].—*Tierärztl. Rdsch.* **42.** 1-4. 3 tables.

Sixteen cows proved by guinea pig inoculation to be suffering from tuberculous mastitis and 33 cows free from mammary tuberculosis were examined by serological means. Complement-fixation tests of whey and blood serum were in close agreement. Whey gave one false and two doubtful diagnoses and serum two false diagnoses. When both examinations were used in conjunction, no cases of tuberculous mastitis were recorded as negative.—E. J. PULLINGER.

SARNOWIEC, W. (1935). Développement des précipitines anti-*Brucella* chez les cobayes tuberculeux. [**Anti-Brucella Precipitins in Tuberculous Guinea Pigs**].—*C. R. Soc. Biol. Paris.* **120.** 1053-1055.

The author states that it is almost impossible to generate precipitins against *Br. abortus* in healthy guinea pigs.

In this paper he relates his experiments showing that tuberculosis in guinea pigs seems to augment the production of *Br. abortus* precipitins, the degree of production being more or less proportional to the advance of the disease.
—GWILYM O. DAVIES.

OLITZKI, L. (1935). **The Antigenic Properties of Bacteria Combined with Antibodies.**—*J. Immunol.* **29.** 453-465. 1 table. [Numerous refs.]

It was found to be impossible to remove all the antibody-producing properties from bacteria by saturation with agglutinins, due to the fact that antibody is absorbed only on the surface of bacteria and, after their lysis *in vivo*, free antigen is liberated and antibody formed. By first saturating the bacteria *in vitro* and then inoculating further quantities of antibody into the host before or after the inoculation of the bacteria, it was found that their antigenic powers were destroyed. The same effect can be obtained *in vitro* by lysing the bacteria with phage before sensitization, showing that, when all the antigen is exposed, it is completely inactivated by the antibody.

A method of producing antisera of high specificity is described.—A. W. T.

SANDOR, G., & NINNI, C. (1935). Etude sur l'haptène lipoidique des extraits aqueux de bacilles tuberculeux vivants. [**The Lipoid Haptens of Aqueous Extracts of Living Tubercle Bacilli**].—*Ann. Inst. Pasteur.* **55.** 38-45. 2 tables. [4 refs.]

The authors describe two peculiar characteristics of aqueous extracts of tubercle bacilli :– (1) these antigens lose their solubility in water after being heated in the presence of alcohol, and (2) the primary extracts fix the complement only slightly or not at all in the presence of tuberculous sera but, after drying and suspension of the residue in alcohol, they become good antigens. Actually the extracts are very complex physico-chemical compounds, and this probably accounts for the unusual characters of their solubility and also for the prolonged operation necessary to extract all the available lipoidal substances in a solvent of ether plus a small amount of alcohol.

They discuss a method of fractional division of the watery extracts of living tubercle bacilli by chemical means into five less complex protein derivatives and give the antigenic values of each.

They conclude that the antigenic values in all cases are really due to adsorbed impurities in the form of the active lipoidal hapten, and that the latter follows the properties of solubility of the substance to which it is adsorbed.—C. V. WATKINS.

DUBOIS, C., & SOLLIER, N. (1935). Prévention de la brucellose humaine (fièvre ondulante) par l'emploi d'un vaccin polyvalent. (Résultats observés de 1929 à 1934). [**Prevention of Brucella Infection in Man by a Polyvalent Vaccine**].—*Rev. Microbiol., Paris.* **1.** 398-412. [13 refs.]

The authors state that their polyvalent anti-brucella vaccine has given excellent results in individuals exposed to infection with any of the brucella species. Each c.c. of the vaccine contains 400 million of each of the following organisms :– *Br. melitensis*, human, ovine and caprine strains, and *Br. abortus*, bovine and porcine strains. Three subcutaneous injections of 0·25, 0·75 and 1 c.c. respectively are given at intervals of eight to ten days. Immunity is established three to four weeks after the last injection, and appears to last for at least four or five years.

During the last five years, over 2,000 persons exposed to infection are said to have been successfully immunized in this manner.—GWILYM O. DAVIES.

MIESSNER, H., & KÖSER, A. (1935). Therapeutische Versuche an Künstlich mit *Brucella abortus* infizierten Meerschweinchen. II. Immunotherapie. [**Therapeutic Experiments with *Br. abortus* in Artificially Infected Guinea Pigs. II. Immunotherapy**].—*Dtsch. tierärztl. Wschr.* **43.** 323-328. 1 fig. [8 refs.] [For abst. of previous article see this *Bull.* **5.** 293].

The danger of disseminating the disease and the public health factor have checked the use of live vaccine for *Br. abortus* infection. The possibilities of dead vaccines and of a bile-attenuated strain are here examined by experiments on guinea pigs. " Chinosol " (Lentz) and iodine (Gminder) preparations [possibly commercial vaccines, preparation not stated] and formalinized vaccine [made by adding 0·25 per cent. formol to six-day-old glucose glycerin broth cultures and incubating for a further seven days], together with a strain attenuated on bile for 76 passages, have been compared. Groups of guinea pigs were inoculated subcutaneously with one or two doses of vaccine, or intraperitoneally with the bile strain, and at varying intervals up to six weeks later they were tested by the intraperitoneal inoculation of living organisms. During the experiments the blood samples were tested for agglutinins at weekly intervals, and four or more weeks after infection the survivors were killed and examined, cultures being made in coal-gas, in carbon dioxide, and in symbiosis with *Chromobact. prodigiosum.*

On the whole the action of the dead vaccines was similar ; the vaccination produced a comparatively low and fading titre, but the test inoculation caused a rise in agglutinins far above that resulting in non-vaccinated controls. Iodine vaccine had the most marked action in this respect. For such " sensitizing " action, however, the bile-attenuated strain far outstripped the dead vaccines ; originally producing a higher titre, the subsequent test inoculation caused a tremendous rise, as high as 100,000 being recorded.

In general, after test inoculation no differences were found in the *post-mortem* examinations of treated and control animals ; splenic and/or liver lesions were usual, and " chinosol " vaccine caused skin necrosis at the inoculation site. Of the survivors, 98 per cent. were found to be infected bacteriologically, as also were 60 per cent. of animals receiving bile strain alone.

It was concluded that no protection had been afforded against infection and that a parallel must not be drawn between agglutinin formation and immunity.

—NORMAN HOLE.

DUBOIS, C., BATAILLÉ, J. M., BATAILLÉ, G., & CANABY. (1935). Pratique simultanée, chez les ovins, de la vaccination préventive contre la clavelée et de la prémunition contre la mélitococcie. **[Simultaneous Vaccination against Sheep Pox and Premunition against** *Brucella melitensis* **Infection in Sheep].** —*Rev. gén. Méd. vét.* **44.** 653-656. [2 refs.]

In a preliminary experiment a mixture of Bridré and Boquet's sensitized sheep pox vaccine and a sensitized *Br. abortus* P vaccine was injected into 20 ewes, and an equal number of ewes received the two vaccines injected separately. The success which attended both these trials led the authors to test the mixed vaccines on 3,864 ewes by injecting the mixture subcutaneously behind the shoulder at the lowest point of the thorax. Approximately half the ewes were pregnant. The results observed during the year following vaccination were very satisfactory ; lambing was normal and the losses were considerably reduced. Ewes which were pregnant when vaccinated and lambed normally have since become pregnant again and the second gestation has revealed equally good results. No cases of sheep pox have since been observed.—GWILYM O. DAVIES.

WALLBACH, G. (1935). La leucocytose comme nouveau test d'immunité. **[Leucocytosis as a New Test of Immunity].**—*Rev. Path. comp.* **35.** 605-619. 1 table. [11 refs.]

After discussing the cellular and humoral reactions in infectious disease, pointing out the great variations in the formation of particular antibodies against

different infections, the author turned his attention to the blood cellular reactions in certain diseases in healthy and immune rabbits following the injection of living bacteria.

He found that at first there was a great decrease in the granulocytes, so that there appeared to be a lymphocytosis, but that in reality the lymphocyte count was normal. If, and only if, the animal possessed any immunity, the granulocyte count became normal and later there was granulocytosis. This stage was immediately followed by the appearance of immature leucocytes.

The author believes that this reaction is a regular one and can be used for assessing the immunity response. He suggests further that the white blood cell reaction varies with the group of bacteria employed ; *e.g.* the reaction is special to each different member of the typhoid and paratyphoid group. When this theory has been further developed by practical research it may be possible to identify unknown bacteria by this reaction of the blood in experimental infection.

—C. V. Watkins.

Ponder, E. (1936). **The Kinetics of Hemolysis.**—*Physiol. Rev.* **16.** 19-51. [Numerous refs.]

The author deals with this under the following headings :–

(1) Hypotonic Haemolysis.—From measurements of red cell volume it has been ascertained that the swelling of red blood cells in hypotonic solutions is much less than it ought to be if the cell were a " perfect osmometer ". It is thought, therefore, that the cell is not a perfect osmometer, but that it reaches equilibrium with its environment by taking in water and also by losing osmotically active substances (mainly cations). Under certain conditions, however, the red cell appears to behave as a perfect osmometer, *viz.* when the medium in which it is suspended does not differ substantially from the plasma which normally surrounds it.

The difference in the fragility of red cells suspended in osmotically equivalent hypotonic solutions of various substances depends mainly upon the fact that leakage of osmotically active substances is greater in solutions of some substances than of others. The reason why the cells of one species of animal haemolyse at a different tonicity of any particular solution from those of another species is that there are differences in the critical volume which different kinds of red cell can attain.

(2) Simple Haemolytic Systems.—A system is called " simple " when the lysin is a single substance, *e.g.* saponin. Here the reaction which results in lysis is accompanied by using up of lysin, presumably by reason of a combination between lysin and some component of the red cell membrane, possibly the protein " stromatin ". The addition of protein to the haemolytic system, *e.g.* by the addition of serum or plasma, results in an inhibition of haemolysis.

(3) Complex Haemolytic Systems, *i.e.* where the lysis is produced by two or more substances acting together, *e.g.* complement and amboceptor. Here lysis occurs only after the cells have been sensitized by a more or less specific sensitizing agent. This may be a specific immune body (amboceptor), or it may be a non-specific sensitizing agent, *e.g.* colloidal silicic acid.

In amboceptor-complement systems the sensitization of cells by amboceptor confers on the cells the property of absorbing complement from solution. This absorption is necessary for lysis. The absorption of complement is greater, the larger the amount of amboceptor used and the velocity of lysis is determined by the quantity of complement so absorbed.

In colloidal silicic acid-complement systems, lysis occurs only when the

systems contain certain definite quantities of silicic acid and complement. If either is present in excess, or in too small a quantity, no lysis occurs. This appears to be due to the component present in excess entering into a side reaction with the other component.

(4) THE MECHANISM OF HAEMOLYSIS.—The phenomenon of haemolysis is due either to stretching, and possibly mechanical rupture of the cell membrane in the case of osmotic haemolysis, or to the chemical transformation and final breaking up of the membrane in the case of chemical lysins. This chemical transformation differs in different cases, *e.g.* a coagulation in the case of heat, a reaction with protein in the cases of saponin and bile salts, an enzyme reaction in the case of bacterial lysins, or a reaction with lecithin in the case of venom.—A. ROBERTSON.

COBURN, A. F., & PAULI, Ruth H. (1935). **Limited Observations on the Antistreptolysin Titre in Relation to Latitude.**—*J. Immunol.* **29.** 515-521. 2 tables. [8 refs.]

A study was made of the antistreptolysin content of the blood of healthy young persons living in temperate and tropical regions. The mean titre of a group of 150 people living south of latitude 35° in North America was 71 units; the mean titre of 231 individuals living north of this latitude was 100 units. It is considered that these figures serve as an index of the prevalence of haemolytic streptococcal infections in the two regions.—E. J. PULLINGER.

SZYMANOWSKI, Z. (1935). Grupy krwi u zwierzat. [**Blood Groups in Animals**].—*Wiad. weteryn.* **13.** 553-566. 2 tables. [7 refs.] [Abst. from French summary].

SZYMANOWSKI, Z. (1935). **Blood Groups in Animals.**—*12th Int. vet. Congr. 1934.* **3.** 521-535. 2 tables. [French, German and Spanish summaries].

SCHERMER, S. (1935). Die Blutgruppen der Haustiere. [**Blood Groups of Domestic Animals**].—*Ibid.* 536-548. [English, French and Spanish summaries: abst. from orig. in German]. [Also appeared in *Z. Rassenphysiol.* **7.** 33-42].

None of these papers is suited to abstraction and should be consulted in the original by those interested in the subject.

Szymanowski discusses the rapid development of the blood group question since LANDSTEINER'S basic work, and its importance in blood transfusion, determination of possible paternity, origin of blood stains, heredity and anthropology. He summarizes the present state of knowledge regarding blood groups in human beings, emphasizing that research on this question is simple and exact, as agglutination is well marked and iso-agglutinins are regularly present. In animals, on the other hand, agglutination is much weaker, whilst natural agglutinins are often actually lacking and must be replaced by immuno-iso-agglutinins. Cases in which the antigenic elements of the cells and sera belong to the same group are also common. Nevertheless, group differentiation analogous to that in man is present in all species so far examined. Secondary differences between antigenic elements of the same group are, however, frequent, particularly in horses.

Schermer reviews in some detail the work that has been done on the blood groups of domestic animals. He discusses the frequent absence of serum properties and the resultant deficient combinations Oα, Oβ, Ao, etc., in addition to the well-recognized combinations O$\alpha\beta$, Aβ, etc. In horses, four further cell characters have been demonstrated, with the results that the blood groups in this species are extremely diverse, *e.g.* ACDEFβ, O$\alpha\beta\gamma\delta$, etc. In all animals the main cell characters are inherited according to Mendel's laws and are dominant over those

that are missing. Serum properties vary. The newly discovered serum characters γ, δ, ϵ, ϕ, are hypostatic to the cell characters C.D.E.F. as are the serum properties α and β to those of the cells A and B, but their mode of inheritance is different and possibly bears a recessive sign.—A. W. STABLEFORTH.

DISEASES, GENERAL.

WILLEMS, R. (1935). Considérations sur la lutte contre les principales maladies contagieuses des animaux en Belgique. [**Animal Disease Control in Belgium**].—*Ann. Méd. vét.* **80.** 337-353.

This paper is a study of the loss to the agricultural industry of Belgium occasioned by contagious animal diseases in that country. A number of conditions are considered in the order of their importance. In the examination of each, special attention is given to the following points :– estimation of incidence, monetary loss attributable to the disease, nature of the losses peculiar to each condition, and measures for improved control.

Bovine contagious abortion is first dealt with. The serious nature of this disease is considered to lie in its legacy of sterility, mastitis and loss of milk yield. The need for educating the peasantry and enlisting their co-operation in control measures is mentioned. Bovine tuberculosis comes next. The tuberculin test has shown 27·6 per cent. of cattle in the country to be affected. Bovine mastitis is the third condition examined. The importance of early treatment is stressed.

Losses attributable to diseases of calves, foals and pigs are then considered, though less fully. Foot and mouth disease and diseases of poultry receive brief mention.—C. DAVENPORT.

SHIRLAW, J. F. (1935). **Pyosepticaemia of Calves.**—*Indian J. vet. Sci.* **5.** 232-250. 6 figs. on 6 plates, 3 tables, 4 charts. [9 refs.]

Calf septicaemia is a serious source of loss in the Punjab and, although adequate statistics appear to be lacking, the author gives the figures for the years 1931 to 1934 in one of the largest cattle breeding farms in the Punjab. The percentage death rate varied from 30 to 57·3. Deaths occurred between May and August and the animals affected were between ten days and four months old. An account is given of the various symptoms and of the *post-mortem* changes. In younger calves the lesions were those of a septicaemia, whilst in older ones the chief lesion was a pleuro-pneumonia in which effusion and early adhesions were prominent. Bacteriological examination of a number of cases showed that the disease is due to an organism of the *Salmonella enteritidis* group. [The Dublin variety of *S. enteritidis* is the commonest salmonella isolated from calves in different parts of the world]. The sera of diseased calves, as well as those of cows giving birth to diseased calves, showed the presence of specific agglutinins. Although it was not possible to transmit the disease by direct contact nor by feeding pure cultures, both subcutaneous and intravenous inoculations of small amounts of culture produced disease which bore every resemblance to the natural cases. The various factors which determine infection are discussed and the view is held that hygienic considerations play a most important role in the genesis of the disease.—R. LOVELL.

ENIGK, K. (1935). Die Aetiologie der Blinddarm- Leberentzündung der Hühnervögel (Blackhead). [**The Aetiology of Blackhead in Poultry**].—*Arch. wiss. prakt. Tierheilk.* **69.** 410-438. 2 figs., 3 tables. [Numerous refs.]

On investigating the varieties of caecal protozoa encountered in fowls and

turkeys, the author was able to detect *Trichomonas gallinarum*, *T. eberthi*, *Chilomastix gallinarum*, *Entamoeba gallinarum* and *Pygolimax gregariniformis*. None of the flagellates were found to penetrate the mucous membrane except, in one case, *Ch. gallinarum*, but this penetration was believed to have occurred *post mortem*. He was unable to detect any flagellates in the liver substance of birds affected with blackhead, but he did find parasitic cells which showed budding in both the liver lesions and the caeca of affected birds.

These cells, which have been described in previous literature as " blastocystis " have often been mistaken for protozoan cysts. They present a variety of forms and staining affinities according to their situation and stage of development. In the small intestine they are oval in form with a small vacuole containing dancing bodies whilst in the caeca they are large and round with a large vacuole, and in the liver they appear as small oval cells with a large refractile granule and a strongly refractile membrane. The organism could be easily cultured on maltose-agar, and 33 positive results were obtained by cultural methods from 36 young turkeys affected with blackhead. In cultures, the organism produced a mycelium.

In a limited number of experiments, culture of the organism was administered to young turkeys either *per os*, intramuscularly or *per rectum*. Culture was also administered with embryonated *Heterakis* eggs, and also to turkeys whose resistance had been reduced by immersion in water. The results of these attempts at artificial infection were not entirely conclusive but, whilst birds tended to resist the administration of the culture alone, those also given *Heterakis* eggs or those also treated by immersion in water tended to develop blackhead. The author concludes that the mould is a wide-spread saprophyte in the intestinal tract of poultry, but that on injury to the mucous membrane by such agencies as *Heterakis*, or on the reduction of resistance, it invades the tissues and sets up disease.—U. F. RICHARDSON.

QUINLAN, J. (1935). **Observations on Sterility of Cattle in South Africa.**—*12th Int. vet. Congr. 1934.* **2.** 367-388. 1 fig., 1 table. [Numerous refs.] [French, German and Spanish summaries].

FREI, W. (1935). Beziehungen des vegetativen Nervensystems zu Störungen der Fortpflanzung beim weiblichen Rind. [**The Relation of the Autonomic Nervous System to Sterility in Cows**].—*Ibid.* 389-405. [English, French and Spanish summaries : abst. from orig. in German].

BOYD, W. L. (1935). **Sterility due to Ovarian Dysfunction.**—*Ibid.* 405-417. [16 refs.] [French, German and Spanish summaries].

SCHÖTTLER, F. (1935). Sterilität. [**Sterility**].—*Ibid.* 418-439. [Numerous refs.] [English, French and Spanish summaries : abst. from orig. in German].

—. (1935). **Discussion of Papers on Sterility.**—*Ibid.* 439-440.

Veterinarians engaged in work on sexual physiology and disease in domestic animals cannot afford to miss reading these review articles in full : the papers are already too concise to abstract.

Quinlan dealt with knowledge gained by the work of himself and other workers in South Africa. He discussed infectious sterility, sexual physiology, particularly of sheep, functional (including malnutritional) sterility and sterility in the male, and made general comments on treatment.

Frei discussed the knowledge on the nervous-endocrine mechanism in relation to sexual health and disorder. Boyd dealt only with the ovary and its treatment in sterility and Schöttler gave a long discourse on the clinical aspects of sterility, of whatever causation, in cattle and horses.

In the discussion, STÄHELI gave a short note on sterility due to anaphrodisia. VEENBAAS described an apparently infectious sterility which causes no gross lesions

and disappears after passing through a herd. A filtrable virus is assumed to be the cause.

GÖTZE commented on the value of vitamin E (present in nearly all foodstuffs) in the treatment of ovarian subfunction, on the value of artificial insemination and on impotence in bulls [see this *Bull.* **5.** 287].—J. E.

BONADONNA, T. (1935). La diffusione dell'aborto e della sterilità bovina nella pianura irrigua padana dal punto di vista zootecnico. [**Extent of Abortion and Bovine Sterility in the Irrigated Padana Plain**].—*Nuovo Ercol.* **40.** 278-287. [3 refs.]

In addition to the more technical bacteriological and pathological problems associated with abortion and sterility, the question of the general method of management of a breeding herd requires attention and, in order to obtain concrete information on this point, the author addressed a questionnaire to the veterinarians and leading agriculturalists in his province. A detailed analysis of the replies is not given, but certain of the more important points are discussed. Disease of the reproductive organs is more common in areas where the farms are large although more attention is paid to preventive measures on large farms than on small farms. The majority of farmers, however, have little idea of the practical value of diagnostic agents and of the prophylactic measures which can be adopted. For this reason, educational facilities should be extended and stress laid on correct feeding, particularly of minerals and vitamins, proper housing conditions, the importance of the bull in maintaining the fertility of a herd and the steps which should be taken to prevent bulls from acting as carriers of infection.—J. A. N.

KAURA, R. L. (1935). **Observations on Sterility in the Cow in India, with Recommendations for its Control.**—*Indian J. vet. Sci.* **5.** 301-318. 13 figs. on 4 plates. [19 refs.]

In this article the author gives a summary of present knowledge of the condition of sterility in the cow. A brief description of the physiology of reproduction in the cow is followed by a discussion of the possible causes of sterility, its diagnosis, treatment and prophylaxis.

The results of examinations, conducted over a period of five years, on animals reported to be sterile at the Government Cattle Farm, Hissar, Punjab, are summarized with regard to aetiology.—A. ROBERTSON.

WILLE, R. (1935). Die Sterilitäts- und Abortus-Bekämpfung beim Rinde in Lichte biologisch-tierzüchterischer Betrachtungsweise. [**The Biological Aspects of Sterility and Abortion**].—*Tierärztl. Rdsch.* **42.** 23-27 and 48-51.

The author discusses the occurrence of bovine sterility and abortion from the points of view of the recovery of the uterus from previous pregnancies, the condition and activity of the udder, nutrition and inheritance. No experimental evidence is submitted, but interesting opinions are expressed. The article is unsuitable for abstraction.—E. J. PULLINGER.

PETERS. (1935). Beitrag zur Kniescheibengelenkentzündung bei Fohlen. [**Inflammation of the Tibio-Patellar Joint in Foals**].—*Berl. tierärztl. Wschr.* **51.** 720-722. 2 figs. [2 refs.]

The author describes a destructive femoro-patellar arthritis in foals two to four months old. Lameness is slight to moderate and the stifle joint is much swollen. The articular surfaces may show large raw areas, denuded of articular

cartilage, and the lateral femoral condyle is usually appreciably worn down, thus predisposing to lateral luxation of the patella. The cause was not determined.
—J. E.

HUTT, F. B. (1934). **Inherited Lethal Characters in Domestic Animals.**—*Cornell Vet.* **24.** 1-25. 8 figs. [32 refs.]

This article reviews the records of the hereditary transmission of lethal characters in domestic stock and poultry. The great majority of known lethal characters have only been discovered in the last six or eight years and, as it is probable that a large number of such characters remain undetected, it is hoped that veterinary surgeons will develop ways and means by which these genetic abnormalities may be recognized. It is explained that these lethal characters are perpetuated by apparently normal animals which carry a gene, or hereditary determiner, for the character which is liable to appear when two such carriers are mated. The characters recorded up to the present can be placed in four classes :– (1) dominant or partially dominant genes exerting a visible effect on the heterozygote (carrier of single gene) and lethal to the homozygote ; (2) recessive genes not visibly affecting the carrier but lethal to the homozygote, and recognizable because the effect is exerted late in foetal life or after birth ; (3) recessive genes whose effects are exerted so early in embryonic life that their existence is detected only by their being linked with a gene for some morphological or colour character, and (4) sex-linked lethal characters, recessive in action, detected by a deficiency of one sex in the offspring.

The existence of a recessive lethal character may be recognized by the recurrence of similar abnormalities in the progeny of related animals, the descent of carriers of the lethal gene from a common ancestor, the 3 : 1 ratio of normal to abnormal offspring when carriers are mated together, and the 7 : 1 ratio of normal to abnormal offspring when a carrier is mated to his daughters.

The following inherited lethal characters are described and some are illustrated.

CATTLE.—Achondroplasia (bulldog calves), recessive achondroplasia, epitheliogenesis imperfecta, hypotrichosis congenita (hairlessness), acroteriasis congenita (malformed face and so-called amputated limbs), short spine, mummified foetuses, lameness in hind limbs (paraplegia), muscle contractures, Lyntikow's "lethal" (short legs and undeveloped digits) and ankylosis of the lower jaw.

SHEEP.—Muscle contractures, rigid fetlocks, paralysis of hind limbs (paraplegia), homozygous grey (colour of wool), Mohr's "lethal" (deformed head and digits) and amputated legs.

SWINE.—Paralysis of hind limbs (paraplegia), thick fore limbs, muscle contractures and atresia ani.

HORSES.—Atresia coli and a sex-linked "lethal".

DOGS.—Cleft palate and hairlessness.

FOWLS.—Recessive white "lethal," congenital loco (chicks continually fall over backwards), creeper fowls (short legs), sticky embryos and congenital palsy.

DUCKS.—Crest (hernia of the brain).

It is pointed out that a sex-linked character lethal to male embryos, operative at an early stage of development, would be valuable in a breed of dairy cattle, as it would cause the females carrying it to produce twice as many female calves as male and would only cause occasionally temporary delays in conception. A gene having the same effect would be welcomed by breeders of Leghorn fowls, but the chromosomes of fowls are such that the sex-linked "lethal" would kill half the females.
—U. F. RICHARDSON.

—. (1935). **Discussion on Haemoglobinuria.** [BARCROFT, J., MINETT, F. C., MACKIE, F. P., SCORGIE, N. J., CHRISTOPHERS, R., WEBER, F. P., & EDWARDS, J. T.]—*Proc. R. Soc. Med.* **28.** 671-680. [17 refs.]

Barcroft outlined present views on the function of Bowman's capsule with special reference to haemoglobinuria.

Minett gave a comprehensive survey of the various conditions naturally occurring in animals, which are characterized by the presence in the urine of red colouring matter, either the haemoglobin of red blood corpuscles or the haemoglobin of muscle [" myoglobin " as used by CARLSTROM – this *Bull.* **1.** 234]. Included were :– (1) haemoglobinurias due to disintegration of red blood corpuscles by protozoa, bacterial toxins, etc., *e.g.* piroplasmosis, " bacillary haemoglobinuria " of cattle in America, associated with a clostridium, " bacterial icterus " of sheep, possibly associated with an organism of the corynebacterium group ; (2) haemoglobinurias associated with diminished resistance of the erythrocytes ; (3) haemoglobinurias of doubtful or unknown origin, *e.g.* puerperal haemoglobinuria of cows, occurring in Great Britain and other European countries and not due to piroplasms, acute enzootic haemoglobinuria and jaundice of sheep, reported in South Africa and Australia, and (4) myoglobinurias :– (a) paralytic myoglobinuria of horses [see this *Bull.* **1.** 234.] ; (b) an enzootic myoglobinuria of horses, of uncertain aetiology, and (c) some recorded cases of myoglobinuria in cattle.—A. ROBERTSON.

REIS, J., REIS, A. S., & NÓBREGA, P. (1934). Moléstias de aves observadas em São Paulo. [**Diseases of Birds Observed in São Paulo**].—*Arch. Inst. biol. Def. agric. anim., S. Paulo.* **5.** 41-49. [17 refs.] [English summary : abst. from orig.]

The authors' observations are based on the laboratory examination of 1,500 specimens. The following are the more important diseases observed, with the percentage of the total which they represent :– parasitic diseases 20, coccidiosis 16, fowl cholera 12, coryza 10, fowl pox 6, leucosis 6, spirochaetosis 5, peritonitis 5, *Salmonella pullorum* infection 4, neurolymphomatosis 3, tumours 2, bumble-foot 1·7, laryngotracheitis 1·5, fowl typhoid 1·3, nephritis 0·8, rickets 0·8, caecal flagellosis 0·5, scaly legs 0·5, aspergillosis 0·3, visceral gout 0·3, tuberculosis 0·3 and blackhead 0·1.

Coryza and laryngotracheitis cause serious losses and are frequently associated with fowl pox on the same farm. Although the word " peste " is applied to outbreaks of disease, fowl plague has not been identified. The coccidium most frequently encountered is *E. tenella*, but *E. maxima* of fowls and *E. meleagridis* of turkeys have also been identified. Blackhead is a serious menace to the turkey industry and has also been observed in fowls. Fowl cholera appears to be evenly distributed on large and small farms in the interior. Fowl typhoid and bacillary white diarrhoea have recently been identified, and imported birds have frequently been found to react to the agglutination test for *S. pullorum*.

A list of internal and external parasites identified in Brazil is included. —R. S. ROBERTS.

I. PATTERSON, F. D. (1935). **Neurolymphomatosis Gallinarum.**—*12th Int. vet. Congr. 1934.* **3.** 265-277. 4 tables. [Numerous refs.] [French, German and Spanish summaries].

II. DOBBERSTEIN, J. (1935). **Neurolymphomatosis Gallinarum.**—*Ibid.* 278-290. [Numerous refs.] [English, French and Spanish summaries : abst. from orig. in German].

I. The author is of the opinion that the paralytic condition, the eye lesions, myeloid and erythroleucaemias and lymphoid leucosis are all different exhibitions of a single virus and are unconnected with parasitism or deficiency disease. The distribution and nature of the lesions in 834 cases are described and, while pathologically the nerve type appears to give rise to a more inflammatory reaction, in general all types simulate a malignant neoplastic change. Experiments describe the transmission of the disease by intraperitoneal inoculation, by contact, and through the egg. It is noteworthy that up to 10 per cent. of control birds showed lesions. The type of lesion resulting from experimental inoculation appeared to be independent of the type of disease from which the infective material was obtained. There are different degrees of inherited resistance, and in the control of the disease selective breeding from such resistant strains is recommended in addition to general hygienic measures.

II. The disease has a world distribution, having been recognized in most countries. The mortality varies generally from 10 to 20 per cent., but it may be as high as 60 per cent. ; autumn and early spring are the usual seasons, and birds three to six months old are chiefly affected. Lesions of either motor or sensory nerves occur, and a great variety of symptoms is possible. Advanced cases may readily be recognized at autopsy. The interstitial neuritis, myelitis or encephalitis results in the formation of new cells of a lymphocytic, leucocytic, or fibroblastic nature, all of which seem to originate from the mesenchyme of vessel walls. Artificial transmission is possible, and while intestinal parasites and dietary deficiencies are not related to this condition, fowl leucaemia shows similarities which require urgent investigation.—NORMAN HOLE.

BERTHELSEN, H., & ERIKSSON, K. (1935). **Epitheliogenesis imperfecta neonatorum in a Foal, possibly of a Hereditary Nature.**—*J. comp. Path.* **48.** 285-297. 6 figs., 1 table. [Numerous refs.]

The term " epitheliogenesis imperfecta neonatorum " is suggested for a condition of innate aplasia of the epidermis with retained corium. A full description is given of an occurrence in a new-born foal in which all four extremities were completely devoid of epidermis, no other pathological change being found. The histological findings are described in detail, and it is considered that the complete absence of evidence of inflammation is sufficient to exclude inflammation or injury of the foetus as aetiological factors. Similarly, the symmetrical distribution of the affected areas is held to exclude amniogenesis.

An attempt was made to find out from the available genetic data whether heredity may be considered to play a part. The evidence is insufficient to warrant any definite conclusion, but the genealogical table suggests the possibility of a process of homozygotic segregation of a recessively hereditable tendency. —E. G. WHITE.

CREZÉE, B. (1936). Reisziekte (transcit tetany) bij pony's. [**Transit Tetany in Ponies**].—*Tijdschr. Diergeneesk.* **63.** 33-35.

Reference is made to an article by DE GIER [this *Bull.* **6.** 364.] describing the occurrence of transit tetany in Welsh ponies. Crezée asks why the available evidence should not be interpreted as indicating a disease due to a fungus instead of transit tetany. He also considers that the beneficial results following Ca and Mg therapy were no greater than might be expected in a horse suffering from any serious illness. A reply by DE GIER is appended at the foot of the article, in which he defends the conclusions originally drawn from his observations.—E. J. P.

DAY, H. G., KRUSE, H. D., & MCCOLLUM, E. V. (1935). **Studies on Magnesium Deficiency in Animals. VII. The Effects of Magnesium Deprivation, with a Superimposed Calcium Deficiency, on the Animal Body, as Revealed by Symptomatology and Blood Changes.**—*J. biol. Chem.* **112.** 337-359. 6 tables, 2 charts. [Numerous refs.] [For abst. of previous article of this series see this *Bull.* **5.** 581].

Young dogs, receiving a diet deficient in Ca and Mg, gradually became oedematous, showed a marked gastro-intestinal disturbance, characterized by alternate periods of constipation and diarrhoea, and lost appetite, leading ultimately to death. The bones were osteoporotic and deformed and in a few cases acute nervous disturbances resulting in death ensued, although death generally occurred through inanition. Weekly blood analyses showed an immediate drop in serum Mg, a gradual fall in the Ca and inorganic P contents, while the alkali reserve and pH diminished and the blood chlorides rose as the red blood cell volume fell. No significant changes were observed in serum sodium and potassium, total lipides, serum bile pigments or plasma albumin and globulin.

The mixed deficiency resembled more closely the effect of Ca deprivation rather than that of Mg deficiency and, in spite of the immediate fall in serum Mg, the usual associated symptoms were not shown. From the symptoms and chemical findings, further evidence is afforded of the physiological antagonism of Ca and Mg in the animal body.—ALFRED EDEN.

MAREK, J., WELLMANN, O., & URBÁNYI, L. (1935). Rhachitisversuche beim Kalb und die Rhachitis-Aetiologie. [**The Aetiology of Rickets in Calves**]. —*Arch. wiss. prakt. Tierheilk.* **69.** 151-166. 4 text figs., 2 tables. [15 refs.]

Complete protocols, including chemical estimations of mineral content of blood and certain bones, are recorded of two calves suffering from experimental rickets and of a non-rickety control animal. From an analysis of these experiments, together with their previous experiences, the authors conclude that in the causation of rickets the important dietary factor is the correct balance of calcium, phosphorus and magnesium. In this particular case they contend that the rickets was due to a negative " Erdalkali-Alkalizität " [E-A] of the ration. A strongly positive E-A figure would also indicate that the ration was rachitogenic.

The authors discuss the common theories of mineral imbalance and they modify their E-A theory somewhat to meet objections which have been raised by certain critics. [The " Erdalkali-Alkalizität " of a diet is ascertained from the formula $[CaO + MgO] - P_2O_5$ after an estimation of the content of the three minerals in the ration has been made. According to the authors' theory, this E-A figure gives a better index of the mineral ration than does the Ca : P ratio. On this basis a diet containing ideal quantities of Ca and P will be rendered rachitogenic if some item in the diet sheet contains abnormal quantities of magnesium oxide – see, however, this *Bull.* **1.** 261].—E. J. PULLINGER.

MONTEVERDE, G. (1934). Cachessia ossifraga (osteomalacia) nelle vacche da latte. [**Osteomalacia in Milch Cows**]. pp. 61. 6 figs. on 3 plates, 3 tables. Bologna : Licinio Capelli. [8vo] [L.7].

In this work, the author has limited himself to a consideration of the aetiology and treatment of osteomalacia in milch cows. His observations are based on experience obtained in a northern district of Italy where the disease is common. Particular attention is paid to a group of 110 cows in which ten cases occurred in the same year ; seven of these animals died.

Osteomalacia is a chronic disease of adults, the final stages of which are

recognized by softening of the bones which predisposes them to spontaneous fracture. Males are less susceptible than females and the condition occurs most commonly in cows giving a high milk yield between the ages of six and ten years. Animals recently imported into the district under consideration appear to be very susceptible to the disease, whilst their progeny are no more susceptible than the native stock, so that hereditary factors play no part in the aetiology of the disease. Frequent pregnancies, especially if twins have been born on one or more occasions, predispose an animal to an attack and symptoms are often observed for the first time at the fourth month of pregnancy. The disease is more likely to appear in dry seasons and in animals grazed on poor pasture, the soil of which is deficient in calcium and phosphorus. The frequency of the disease increases with altitude, and animals kept for long periods in unhygienic stalls are also liable to become affected.

Whilst the conditions discussed above predispose an animal to an attack, the disease really develops as a direct result of an improper diet, particularly from one deficient in minerals and vitamins. In order to maintain the acid-base equilibrium of the body, calcium is required to neutralize any excess of acid which may be present. If this base is lacking in the diet, it is immediately withdrawn from the bones. It is also probable that vitamins A and D are responsible for the fixation of calcium, or at least prevent decalcification of the bones. These vitamins are contained in the green leafy portions of plants and are likely to be lacking in dry seasons when the herbage has failed to grow or has wilted. The internal secretions of the ductless glands also play a part in the aetiology of the disease, particularly the ovary which influences the excretion of organic phosphorus in the urine. On removal of the ovaries, this substance is no longer excreted in the urine and it may be that in osteomalacia there is an over-activity on the part of the ovaries. The bacteria associated with the disease are secondary and become active only when the animal is already debilitated.

Treatment is likely to be of little value unless an early diagnosis has been made. Once the characteristic clinical symptoms have appeared, the disease is nearly always fatal. In order to hinder the draining of calcium from the body, milking should be suspended ; inflation of the udder often gives temporary relief. A liberal supply of green food and mineral salts should be provided, together with cod-liver oil. Injections of soluble calcium compounds have given favourable results, *e.g.* calcium gluconate and a mixture of calcium carbonate, and ferrous sulphate and sodium chloride given *per os*. It is also important to pay strict attention to the hygienic conditions under which the animals are kept.—J. A. NICHOLSON.

STOCKKLAUSNER. (1935). Neuere Forschungsergebnisse auf dem Gebiete der Mineralstoffütterung. [**Recent Advances in the Feeding of Minerals**].—*Münch. tierärztl. Wschr.* **86.** 457-461. [41 refs.]

The author gives the results of the most important advances in the knowledge of the feeding of minerals to animals and emphasizes that the effects of lack of minerals show themselves slowly, and are often only detected on the appearance of diseases which are not the result of the deficiency but are precipitated by it. —R. G. LINTON.

SAATHOFF, H. (1935). Acetonkörper und deren Vorkommen im Harn gesunder und kranker Rinder. [**The Presence of Acetone Bodies in the Urine of Healthy and Diseased Cattle**].—*Inaug. Diss., Hanover.* pp. 48. 5 tables. [Numerous refs.]

Examination for acetone bodies in the urine was effected by the nitro-prusside

and iodoform tests ; in the former test the Imbert-Bonamour modification was used, which is sensitive to acetic acid. Cows immediately prior to parturition showed a low-grade acetone content and animals suffering from digestive symptoms were similar in this respect. Those suffering from true acetonuria could readily be identified by means of quantitative tests.—E. J. PULLINGER.

PUBLIC HEALTH.

WILSON, G. S. (1935). **The Bacteriological Grading of Milk.**—*Spec. Rep. Ser. med. Res. Coun., Lond.* No. 206. pp. 392. 29 figs., 169 tables. [Numerous refs.] London : H.M. Stat. Off. [8vo] [7s. 6d.]

This report, covering three years of intensive work, relates solely to bacteriological methods by which the degree of cleanliness and the keeping quality of milk may be determined.

The existing standards – plate count and test for coliform bacilli – are severely criticized. Plate counts entail too many sources of error commencing with faults of sampling and ending only with enumeration of colonies. During transit both shaking and aeration tend to increase the bacterial count, although this can be obviated to some extent by filling the sample bottle up to the neck. In the laboratory there is the difficulty of obtaining homogeneous suspensions for plating purposes, the impossibility of devising a medium that would be optimal for all bacteria under given conditions, and the personal factor, namely, variations in the working accuracy of different individuals. There is ample evidence, too, that colonies are derived, not solely from individual organisms, but frequently from aggregates which, apart from their variable distribution in the original sample, are subject to uncontrollable disintegration during the process of dilution. In short, the technique is so complex and practically so impossible to standardize that plate counts should be discontinued as a method of grading milk.

Much attention has been given to the methylene blue reductase test, a modification of which is recommended. The solution of methylene blue is prepared from tablets, one of which is dissolved in 200 c.c. of warm, sterile, distilled water. When cool the solution is made up to 800 c.c. ; 1 c.c. of this added to 10 c.c. of milk yields a dilution of approximately 1 : 300,000. Methylene blue-milk mixtures are made in tubes fitted with sterile rubber stoppers and slowly inverted once before they are placed in the water-bath – at 37° to 38°C. for raw milk and at 55° or 63°C. in the case of pasteurized milk. Observations are made every 30 minutes and after each observation the tubes are inverted once. The end-point is complete decolorization or decolorization up to within 5 mm. of the surface, and the time required for that reaction is considered to give a reliable indication of the degree of cleanliness and the probable keeping quality of the sample. This test has the merits of simplicity, cheapness and minimal experimental error, besides being virtually uninfluenced by the degree of aggregation of bacteria or the numbers of leucocytes (unless excessive) in the sample.

Four methods are given for the quantitative determination of coliform bacilli, but none was found to give an accurate estimate of their numbers. For this reason it is strongly recommended that an arbitrary number be agreed upon as " standard ", and that the test for coliform bacilli be reported as above or below this standard.

Other tests, such as the leucocytic count and the sediment test, are considered unsuitable for routine grading excepting Breed's smear method which, although definitely inferior to the methylene blue reductase method, is of some practical value as a rapid mode of distinction between clean and dirty milk.—J. W. EMSLIE.

I. KAY, H. D., & GRAHAM, W. R., Jr. (1935). **The Phosphatase Test for Pasteurised Milk.**—*J. Dairy Res.* **6.** 191-203. 1 fig., 5 tables. [6 refs.]

II. KAY, H. D., & NEAVE, F. K. (1935). **Some Results of the Application of a Simple Test for Efficiency of Pasteurisation.**—*Lancet.* **228.** 1516-1518. 1 table. [3 refs.]

I. The authors present two tests for the efficiency of pasteurization of milk, based on the heat instability of phosphatase with its ability to hydrolyze a phenyl phosphoric ester. Small quantities of the milk are added to a large excess of disodium phenyl phosphate. This is incubated at 37°C. for a standard time, during which the phosphatase hydrolyzes the ester, liberating proportionately free phenol ; this forms a blue colour with Folin's phenol reagent and can be colorimetrically compared with a standard blue and the phosphatase thus expressed in terms of standard units. The two tests are similar in principle, the main difference lying in the much longer period of incubation given to detect minor errors of pasteurizing technique. Gross errors of pasteurizing technique are detected by one test and, by the other, minor errors such as slight deviation from the legal requirement of heating time or temperature or subsequent adulteration with small quantities of raw milk.

The tests have been carefully checked up under controlled laboratory conditions and are recommended as being quick, certain and simple, and capable of detecting deficiencies below the legal standards.

II. By application of the above tests to samples of commercially pasteurized milk, the authors find that (a) many pasteurizing plants are either inefficient or inefficiently operated ; (b) properly designed and supervised plants are satisfactory ; (c) the majority of larger firms use efficient methods and plants, and (d) much of the milk for school children is inefficiently pasteurized. They recommend that all milk be of a Grade A standard prior to pasteurization.—ALFRED EDEN.

RINJARD, P., & GUITTONNEAU, G. (1935). Le rôle du lait et de ses dérivés dans l'étiologie de la fièvre ondulante. [**The Role of Milk and Milk Products in the Aetiology of Undulant Fever**].—*Rev. Microbiol., Paris.* **1.** 359-378.

Epidemiological enquiries in France show that *Brucella melitensis* and *Br. abortus* infection are chiefly conveyed from animal to man by direct contact with animals, and only very rarely through milk and its derivatives. Infection in milk is easily destroyed by pasteurization and, in the processes of butter and cheese making, the organisms rarely survive lactic acid fermentation and the other steps involved.

Vaccination is suggested as a protective measure for those whose duties bring them into contact with infected animals.—GWILYM O. DAVIES.

STOSS, A. O. (1935). Gutachten über die Uebertragbarkeit der Banginfektion auf den Menschen und den Zeitpunkt des Inkrafttretens diesbezüglicher gesetzlicher Bestimmungen. [**The Transmissibility of *Brucella abortus* Infection to Man. A Claim for Negligence**].—*Münch. tierärztl. Wschr.* **86.** 589-594, 602-607 and 613-616. [Numerous refs.]

A motor driver, who assisted a veterinarian while he was inoculating cattle with cultures of *Br. abortus*, subsequently became ill and claimed damages. The question arose whether at the time it was common knowledge among veterinarians that *Br. abortus* infection was transmissible to man, in which case the veterinarian, and possibly the manufacturer of the material, would have been held liable. The opinion expressed, after an examination of all the literature, was that by 1929 the transmissibility of the infection was known to be possible, but neither definitely

denied nor definitely asserted. There is today no doubt that the disease can be transmitted ; in Germany the first cases were serologically discovered in 1926. In the following year frequent transmissions to man were described, but the transmissibility was not yet so well known that veterinary surgeons should be expected to reckon with it as a possibility.—F. BULLOCK.

VAN ENDT, P. J. (1935). Miliaire tuberculose van de nier als criterium bij de vleeschkeuring. Een bacteriologisch en histologisch onderzoek. [**Miliary Tuberculosis of the Kidney as a Criterion in Meat Inspection**]. pp. 227. 6 text figs., 16 figs. on 4 plates, 27 tables. [Numerous refs.] Utrecht : Drukkerij Fa. Schotanus & Jens. [8vo].

The incidence of bovine tuberculosis in the human being is discussed, and an abbreviated historical review of the examination of meat for infection with tuberculosis is given. The various opinions held by investigators regarding the significance in meat inspection of tuberculous bacillaemia and the relation between this bacillaemia and infection of the lymph glands and muscles are discussed. Efforts to demonstrate bacillaemia in domestic animals have met with variable results. Following the examination of seven calves artificially infected with tuberculosis and 20 spontaneous cases of disease, it is concluded that Löwenstein's and Woerden-Willem's methods are both suitable for blood culture. A diagnosis of miliary tuberculosis of the kidney can be taken as presumptive evidence that these organisms are also present in the glands and meat. The absence of macroscopic lesions in the kidney does not exclude the possible presence of infection which could be discernible by microscopic examination.—E. J. PULLINGER.

LENFELD, J. (1935). In welchen Fällen ist auf Grund der bisherigen Erfahrungen die Durchführung der bakteriologischen Fleischuntersuchung unerlässlich. [**Conditions found at Meat Inspection for which Bacteriological Examination is Necessary**].—*Vet. Gesundheitsdienst.* Suppl. to *Prag. tierärztl. Arch.* pp. 10-17. [17 refs.]

Meat should be examined bacteriologically if there is any reason to suspect contamination with a member of the genus *Salmonella*. Unfortunately, salmonella may also be present in carcasses free from obvious lesions.—E. J. PULLINGER.

KANIUTH, H. (1935). Ueber die Biologie verschiedener Anreicherungsverfahren bei der bakteriologischen Fleischuntersuchung. [**Enrichment Media for Use in Bacteriological Meat Inspection**].—*Inaug. Diss., Berlin.* pp. 42. 16 tables. [Numerous refs.]

The author considers that malachite green broth is superior to either Wilson and Blair's medium or to tetrathionate broth for isolating salmonella from contaminated material. The advantages which he claims are :—(1) that at incubation temperature the pH of the medium is more stable ; (2) that it allows *Erysipelothrix rhusiopathiae* (swine erysipelas bacillus) to grow and thus serves a double diagnostic purpose ; (3) that salmonella grown in this medium agglutinate better, and (4) that the medium inhibits *Bact. coli* more successfully than do the other two media. [Wilson and Blair's medium is notoriously unreliable in the hands of the beginner. Nevertheless in the hands of the expert the medium is of very great value for the identification of certain pathogenic species of salmonella].—E. J. PULLINGER.

WESSELMANN, A. (1935). Bakteriologische Untersuchung von Enteneiern. [**Bacteriological Examination of Ducks' Eggs**].—*Inaug. Diss., Berlin.* pp. 44. 19 tables. [Numerous refs.]

Over 200 fresh ducks' eggs were collected from two flocks which were infected with *Salmonella typhi-murium.* This organism was isolated from inside ten eggs and from the outside of the shells of 21 others. Such organisms can pass through the shell and so infect the inside. The passage through the pores of the shell occurs more rapidly in eggs which have been preserved in lime-water.—E. J. P.

I. FROMME, W. (1934). Weitere Beobachtungen über Nahrungsmittelvergiftungen durch Enteneier. [**Further Examples of Food Poisoning from Ducks' Eggs**].—*Arch. Hyg., Berl.* **113.** 29-45. [5 refs.]

II. —. (1934). **Food-Poisoning by Ducks' Eggs.**—*Brit. med. J.* Dec. 1st. 1002-1003.

I. Fromme gives an account of 19 outbreaks of food poisoning, due to salmonella, occurring between December, 1932, and January, 1934 ; 99 people were affected, four of whom died. Fifteen of the outbreaks were caused by *S. typhi-murium* and four by *S. enteritidis.* Ducks' eggs were definitely incriminated as transmitters of the infections in the majority of cases. In 75 instances the causal organism was demonstrated in the patients' stools, and once in the urine. It is remarked that the disease may give rise to such mild symptoms as to escape the knowledge of the doctor or district medical authorities. Potato salads, mayonnaises, mincemeat, puddings, milk soups, etc., to all of which had been added some form of raw or lightly-cooked ducks' eggs, were found to be sources of infection, and in five outbreaks the organism was recovered from the remains of the suspected food. For the most part the eggs were imported from Holland, preserved in lime-water (" Kalkeier "), but some were locally produced. The Khaki-Campbell breed appears especially susceptible to such infections, and it is pointed out that epizootics are apparently common among these ducks in Holland.

In considering protective measures, some embargo against Dutch eggs may be necessary, and a thorough bacteriological and serological examination of local Khaki-Campbell farms is indicated. Routine disinfection of the eggs would be helpful only in cases of faecal contamination of the shell. The general public should be properly informed of the danger, mere warning against eating raw ducks' eggs not being sufficient, as contact infection may occur in the household, and the heat used in the preparation of many egg dishes offers no certain assurance of the death of the organisms.

II. An annotation on the above.—NORMAN HOLE.

CLARENBURG, A., & POT, A. W. (1935). Voedselvergiftiging bij den mensch in verband met eendenparatyphose. [**Duck Paratyphoid as the Cause of Disease in Man**].—*Tijdschr. Diergeneesk.* **62.** 1240-1246. 2 tables. [5 refs.] [English, French and German summaries : abst. from orig.]

Nine persons were affected with gastro-enteritis after eating pies prepared with ducks' eggs. The symptoms were vomition, diarrhoea and fever. *Salmonella typhi-murium* was cultivated from a pie and from the faeces of three persons. Six of eight laying ducks gave a positive reaction to an agglutination test with *S. typhi-murium* and the same organism was isolated from the faeces of one of these six birds. All the ducks were killed. Two were suffering from *S. typhi-murium* infection with localization in the ovary.—M. J. J. HOUTHUIS (ROTTERDAM).

THERAPEUTICS.

PEDLOW, J. T., & REINER, L. (1935). **On the Mechanism of Chemotherapeutic Action. XII. Comparison of the Binding of Chemotherapeutic Agents by Normal and Resistant Trypanosomes.**—*J. Pharmacol.* **55.** 179-199. 12 tables. [17 refs.]

This article records experiments on the binding of arsenic, as neoarsphenamine or mapharsen, and of acriflavine by normal and resistant strains of *Tryp. equiperdum* and *T. lewisi.* In the case of arsenic binding, it was found that resistant trypanosomes did absorb arsenic and that the power of arsenic binding was not proportional to the killing power of the drug to the protozoa. Whilst normal trypanosomes absorbed a greater proportion of arsenic from low concentrations of the drug than did resistant trypanosomes, yet in concentration sufficient to kill both strains in the same average time the binding was the same. Again, in media which were free from glucose, resistant strains absorbed as much arsenic as non-resistant strains. It is suggested that the fact of binding a greater quantity of arsenic may depend upon the damage of the organisms, and resistant strains may survive owing to their resistance to damage, or to tolerance. The possibility that acquired resistance may be due to a change in the binding substance, resulting in decreased affinity for arsenic, is also discussed. In addition to the effect of glucose starvation, the effects of variation in the oxygen tension and the pH of the media on the arsenic binding were also investigated.

In the case of acriflavine, though strains resistant to neoarsphenamine absorbed slightly less of the drug *in vitro* than did normal strains, a marked difference in drug absorption became evident *in vivo.* In the case of this drug, the presence or absence of glucose did not affect the amount of binding, and it is suggested that here the question of damage does not affect the result, and that other factors must be involved. It is suggested that acriflavine must be deposited either round the organisms or in the surface membrane. [Previous abstracts on this subject refer to work by VON JANCSÓ and FISCHL & SINGER – this *Bull.* **6.** 72 and 74].—U. F. R.

VON JANCSÓ, N., & NOVÁK, E. (1935). Mikrobiologische Grundlagen der chemotherapeutischen Wirkung. II. Mitteilung: Mikroskopischer Nachweis des chemotherapeutisch verabreichten Goldes in Spirochäten, Trypanosomen und Bacterien durch Ultrakristallisation. **[Microbiological Foundations for Therapeutic Action. II. Microscopical Demonstration of Gold in Spirochaetes, Trypanosomes and Bacteria by Ultracrystallization].**—*Zlb. Bakt. I. (Orig.).* **134.** 76-86. 2 figs. [15 refs.] [For abst. of previous article, see this *Bull.* **6.** 72].

The authors describe a method of detecting gold in spirochaetes from animals which have been treated with gold compounds: The method depends upon the crystallization of gold from supersaturated solution under the influence of the crystals derived from the spirochaetal contents. Smears are ashed by heating over a bunsen burner according to the technique described, treated with a warm solution of gold chloride, potassium carbonate and potassium ferricyanide to which formalin is added as a reducing agent. Examined by dark field illumination, preparations from treated animals show shining, golden yellow, sharply defined spirochaetes. The method is said to detect quantities of gold equivalent to as little as 300 atoms, and it is suggested that it might also be used for the detection of gold absorption by trypanosomes or the tubercle bacillus. [The method is very delicate and demands minute attention to the purity of glass-ware and reagents. The article should be consulted in the original].—U. F. RICHARDSON.

STEWART, J. L. (1935). **Treatment of Trypanosomiasis by Tartar Emetic, Antimosan and " Surfen C " in the Gold Coast.**—*J. comp. Path.* **48.** 316-318. [1 ref.]

This article records that out of 29 cattle, of which one was infected with *Tryp. congolense* and the rest with *T. vivax*, treated by five injections of 40 c.c. of " antimosan " given at weekly intervals, two animals died and 27 recovered.

Sixteen cattle, of which two were infected with *T. congolense* and the rest with *T. vivax*, were treated by five intravenous injections of 12 to 15 g. sodium antimony tartrate, given at intervals of five days. All these cattle have since been negative to microscopic examination, except one which relapsed once, but became negative after a second course of treatment.

Fifty-four cattle were treated by one intramuscular injection of 100 c.c. " surfen C ", but 14 relapses occurred in this group after treatment.

Some of the cattle under treatment belonged to the West African shorthorn breed which is very resistant to trypanosomiasis, and others to the zebu breed which is said to be very susceptible to the disease.—U. F. RICHARDSON.

KIKUTH, W. (1935). Die Chemotherapie der Piroplasmosen. [**The Chemotherapy of Piroplasmosis**].—*Zlb. Bakt. I.* (*Orig.*). **135.** 135-147. 4 tables. [Numerous refs.]

This article reviews the literature on the medicinal treatment of piroplasmosis, and discusses the claims which have been advanced recently for the efficacy of certain new drugs.

" Todorit " (a preparation of bismuth salicylate) is said to be efficacious in the treatment of infections due to *Babesia bovis*, and success has been claimed for it in disease due to other piroplasms, but the numbers of animals under treatment have been too small to form a definite judgement. The author did not find it of any value in the treatment of canine piroplasmosis.

Good results have been claimed for " ichthargan " (a compound of silver and ichthyol) in infection with *B. bovis* and *B. bigemina* and other infections of cattle and sheep, but one dose is not sufficient to effect a cure and treatment must be repeated.

The drugs which can be accepted as of proved efficiency are trypan blue, " trypaflavine" ("gonacrine") and " acaprin". As it is not always advisable to await a definite identification of the species of the parasite involved, it is important that the drug used should have a wide range of action, and a comparison of the value of these three drugs is shown in the following table:–

SPECIES	HOST	TRYPAN BLUE	" TRYPAFLAVINE "	" ACAPRIN "
B. canis	dog	+	++	++
B. bigemina	ox	+	+	++
B. argentina	,,	(+)	+	++
B. bovis	,,	++	++	++
B. divergens	,,	O	—	+
B. berbera	,,	O	+	++
B. caballi	horse	+	+	++
B. equi	,,	O	+	++
B. trautmanni	swine	—	—	++
Th. parva	ox	O	O	—
Th. dispar	,,	O	O	+
Th. annulata	,,	O	O	+
Th. mutans	,,	O	O	O

It has been claimed that " trypaflavine " is effective in the treatment of *Th. dispar*, but this has been disputed. " Acaprin " is said to be effective in the treatment of British redwater, but some animals fail to respond to treatment. Though efficacious in the treatment of some theileria infections, this drug is said to be valueless against *Th. mutans*, but the low pathogenicity of the organism discounts this failure. No information is yet available as to the value of this drug in disease due to *Th. parva*.

Trypan blue and " trypaflavine " are both irritant and should be given intravenously to avoid abscess formation. They both colour the tissues of the animal under treatment. " Acaprin " can be given subcutaneously or by the mouth and it does not stain the flesh or milk.

Trypan blue is believed to act by stimulating the defence mechanism of the host; it does not destroy the parasites and leaves carrier animals. " Trypaflavine " works with remarkable rapidity and probably acts directly on the parasites, leaving completely recovered animals. The administration of " acaprin " may be followed by symptoms of shock which, though alarming, are usually very transient. In babesia infections the drug appears to attack the round or oval forms of the parasites which disappear early, leaving the pear forms which disappear later. In theileria infections the drug appears to attack the schizont forms. Trypan blue is said to aggravate anaplasma infections which are commonly associated with babesia. " Trypaflavine " is said to have a beneficial effect in anaplasmosis, but probably it has little real value in the treatment of this condition.

The author considers that anaplasma are probably related to the *Bartonella* and not to the piroplasms, and suggests that, for mixed infections, arsenical treatment should be combined with the specific treatment for piroplasmosis. In view of this opinion he does not anticipate that " acaprin " will be of any real value in the treatment of anaplasmosis.—U. F. RICHARDSON.

CERRUTI, C. G., & FANTONI, F. (1935). Ricerche sulla chemioterapia della piroplasmosi con il nuovo prodotto Bayer " Acaprin ". **[Chemotherapy of Piroplasmosis with " Acaprin "].**—*Clin. vet., Milano.* **58.** 542-552.

This article records the results of " acaprin " treatment on animals infected, either naturally or artificially, with *Babesia bigemina*, *B. berbera*, *B. equi*, *B. caballi*, *Theileria annulata*, *Anaplasma ovis* and a piroplasm of swine, probably *B. suis*.

Sixty-one cattle infected with *Th. annulata* were treated, with 55 recoveries and six deaths. The dose of " acaprin " varied from 20 to 75 cg. given by subcutaneous injection, but a dose of 60 to 75 cg. is recommended. The drug appeared to act particularly on the schizont stage of the parasites, Koch's bodies disappearing within 48 hours of treatment, except in rare cases in which the bodies were present in enormous numbers. The bacillary and ring forms of the parasite in the peripheral blood might persist for some time.

Of 181 cattle infected with *B. berbera*, 20 died, but the majority of these deaths occurred in the early stages of the work and were probably due to the use of too small a dose. The dose recommended is 60 to 75 cg., a second or even a third treatment with slightly decreased doses being occasionally necessary. In the case of this parasite, the drug appears to act on the round or amoeboid forms, whilst the pear forms are the last to disappear.

In six cases of *B. bigemina* infection, doses varying from 30 to 75 cg. were efficacious.

Infections of horses with *B. equi* and *B. caballi* were successfully treated by the subcutaneous injection of 30 cg.

Five cases of piroplasmosis in pigs were treated by the injection of 15 cg.,

resulting in four recoveries and one death. Four cases of infection of sheep with *A. ovis* recovered after treatment by the injection of 10 cg., but the number of animals was too small to judge the value of the treatment.—U. F. RICHARDSON.

LAFENETRE, H., & VERDIER, O. (1935). Babésiellose ovine atypique. Guérison par la gonacrine. [**Treatment of Atypical Ovine Piroplasmosis with " Gonacrine "**].—*Rev. vét., Toulouse.* **87.** 615-619. [3 refs.]

This article records observations on an outbreak of ovine piroplasmosis due to *Babesia ovis* near Montpellier in France. The disease was characterized by high fever and a peculiar form of respiration (slow inhalation, violent expiration), but neither jaundice nor haemoglobinuria occurred. There was a difficulty in detecting parasites in the blood. After eight animals had died and 20 others were affected, treatment by the intravenous injection of 3 c.c. of a 5 per cent. solution of " gonacrine " was adopted. Of the 19 animals treated, 4 died, 9 recovered after one injection and 6 relapsed about 25 days after the first injection, but recovered with further " gonacrine " treatment.—U. F. RICHARDSON.

CUILLÉ, J., & DARRASPEN, E. (1935). La quinacrine dans le traitement de la piroplasmose du chien. [**" Quinacrine " in the Treatment of Canine Piroplasmosis**].—*Rev. vét., Toulouse.* **87.** 665-666.

The authors recommend the intravenous injection of " quinacrine " in doses of 0·005 g. per kg. body weight for the treatment of canine piroplasmosis. Toxic effects may be produced by a dose of 0·01 g. per kg., but the smaller dose recommended can be repeated every four to six hours without danger, if the first injection is not effective in reducing the fever.—U. F. RICHARDSON.

FRENEY, M. R., MACKERRAS, I. M., & MACKERRAS, M. J. (1935). **A Note on New Dressings for Fly-Struck Sheep.**—*J. Coun. sci. industr. Res. Aust.* **8.** 161-168. 1 fig., 1 table.

The finding that glycerin and boric acid rendered minced liver baits almost completely unattractive to blowflies, together with other considerations, led the authors to test out various combinations of these two chemicals as dressings for strikes. Glycero-boric acid, a mono-boric preparation, a di-boric preparation and a tri-boric preparation were tested on over 100 artificially produced strikes. The dressings were found to be rather too viscid, but nevertheless penetrated and persisted in the wool and on the skin fairly well. They had no harmful effect on the skin of the sheep and had a decidedly beneficial effect on the wounds. The larvicidal action of the dressings was slow but satisfactory and all the preparations prevented re-strike up to 40 days under experimental conditions.—W. I. B. B.

SCHANG, P. J., & PAVÉ, S. (1934). Lucha antihelmintica contra el ascaris suilla. [**Anthelmintic Campaign against** *A. suilla*].—*Rev. Med. vet., B. Aires.* **16.** Nos. 4, 5 & 6. 3-9.

A. suilla is a cause of serious loss to pig-breeders in the province of Buenos Aires. The use of various vermifuges was tried in conjunction with strict attention to hygiene. It was found that oil of chenopodium alone, given in doses of 8 to 12 c.c. to sucking pigs of 15 to 30 kg. body weight, after a fast of 12 to 20 hours, was efficacious, but that better results were obtained if this drug was mixed with castor oil.

Further experiments showed that a mixture of oil of chenopodium and thymol was the best vermifuge for ascaris, and that a purgative was not required. The dose was found to be 1 c.c. oil of chenopodium, 1 g. thymol and 28 c.c. of vegetable

oil, given after a fast of 18 to 36 hours, followed by a fast of 2 to 3 hours. The ascarids were eliminated in 24 hours to six or seven days after administration. There was a mortality of 2 to 3 per cent. in the pigs treated, due to passage of the medicament into the bronchi.

MÖNNIG, H. O. (1935). **Oesophagostomiasis in Sheep.**—*J. S. Afr. vet. med. Ass.* **6.** 250-252.

Reference is made to several practical points in the use of the copper arsenate and tartrate treatment. The preliminary copper sulphate solution can be increased to 10 per cent. strength with advantage. The addition of slaked lime to the copper arsenate and tartrate mixture was found to lessen its occasional toxicity due to acidity of the abomasal contents.—E. M. ROBINSON.

CAMPBELL, W. A. (1935). **Insulin in the Treatment of Equine Myoglobinuria.** —*Vet. Rec.* **15.** 1547.

This paper is the clinical record of a severe case of equine myoglobinuria paralytica treated with insulin. Subcutaneous injections of 200 units each were made once daily for seven consecutive days. The author reports that marked relief followed each injection and considers that the drug definitely had a palliative action in this case. Death, however, occurred on the ninth day. He questions whether larger doses at 24-hour intervals, or smaller doses given twice daily might not prove of even greater benefit [see also this *Bull.* **6.** 171].—C. DAVENPORT.

WITTS, L. J. (1936). **The Therapeutic Action of Iron.**—*Lancet.* **230.** 1-5. 2 figs., 1 table. [Numerous refs.]

The author gives a survey of present knowledge of the metabolism of iron in man. The physiological and pathological conditions affecting the requirement, absorption and utilization of iron are discussed. From his own experience and from a survey of the literature he concludes that the absorption of iron contained in food and drugs is proportional to the ease with which ferrous ions are liberated. —A. ROBERTSON.

POISONS AND POISONING.

HENRY, M. (1935). **Gas Warfare as Affecting Horses and Mules.**—*Aust. vet. J.* **11.** 143-148.

The author first discusses the effects of, and counter measures against, the various poison gases.

In the Great War, the Australian observers were impressed with four salient features in connexion with the effect of mustard gas on horses :– (1) the severe effect of the gas on stabled horses as compared with those left in the open ; (2) the serious effect of movement on gassed animals ; (3) the delayed action of the gas – skin lesions in some cases did not become severe until five or six days after the attack, and (4) the difficulty of evacuation.

The problem of safeguarding horses and mules from gas is by no means easy as the various masks and methods of protecting the legs are not satisfactory. Nevertheless the author does not agree with those who believe that gas warfare will prevent the use of horses in future wars. Besides, it is very probable that chemical warfare against mechanized transport will be developed.—W. I. B. B.

VEENENDAAL, H. (1935). Loodintoxicatie en basophiele korreling der roode bloedlichaampjes. [**The Basophile Granulations in Red Blood Cells in Lead Poisoning**].—*Tijdschr. Diergeneesk.* **62.** 244-253. [41 refs.] [English, French and German summaries : abst. from orig.]

In the guinea pig, rabbit, dog and fowl, basophile granulations are found in red blood cells in cases of lead poisoning. Blood films are fixed with absolute methyl alcohol and stained by Giemsa's stain or Süssmann's borax toluidine-blue solution. The study of the blood picture is helpful in the diagnosis of lead poisoning in large domestic animals.—M. J. J. HOUTHUIS (ROTTERDAM).

RIMINGTON, C. (1935). **Chemical Investigations of the " Gifblaar "** *Dichapetalum Cymosum* (**Hook**) **Engl. I.**—*Onderstepoort J. vet. Sci.* **5.** 81-95. [7 refs.]

In this paper the methods used by the author in his attempt to isolate the toxic principle of " gifblaar " are described. Owing to its solubility in water alone, it was found very difficult to remove other water-soluble substances, but concentrates free from carbohydrates were obtained. Another difficulty was its chemical inertness. It is concluded that the active principle almost certainly contains nitrogen, and it is suggested that this may be included in some cyclic structure. Owing to the difficulty in finding any substance to combine with or precipitate the toxin, the hope of finding a curative substance is remote.—E. M. ROBINSON.

PHYSIOLOGY.

RANQUINI, J. H. (1934). Espermatogénesis del caballo. Estudios cromosómicos en los períodos gonial y meiótico. [**Spermatogenesis of the Horse. Chromosomic Studies in the Gonadial and Meiotic Periods**].—*Trab. Inst. Biol. anim. Madr.* **2.** 185-196. 5 figs. [9 refs.]

Previous workers have not agreed on the number of chromosomes present in the haploid and diploid nucleus. KIRILLO in 1912 gave the numbers as 10 to 16 and 20 to 32 respectively, while WODSEDALEK in 1914 gave them as 18 to 19 and 37. According to PAINTER (1924) the numbers were 30 and 60.

The author, working with material obtained from testicles preserved in Ringer's solution, fixed in the reagents of Lenoir and San Felice, and finally cut in sections 10μ thick, stained by Heidenhain's iron haemotoxilin, and Nawaschin's modification of Newton's gentian violet method, concludes that the number of chromosomes in the horse varies between 24 and 26 in the haploid, and 46 and 52 in the diploid nucleus. The variations are probably due to the production of " satellites " from the fragmentation of one or more chromosomes. The determining sex factor corresponds in all probability to the type X Y, as suggested by PAINTER, but a final decision on this point would necessitate confirmative investigation in the female.—NORMAN BISSET.

HOUSSAY, B. A., DEULOFEU, V., & MARENZI, A. D. (1935). **The Hormones.**—*Ann. Rev. Biochem.* **4.** 279-310. 4 figs. [Numerous refs.]

In this review, each ductless gland is considered separately and the results of the most recent investigations are briefly stated and discussed.

Oestrone can be obtained in three forms and, from reduction experiments, it appears certain that an aromatic nucleus is present in its molecule. The abundant production of oestrone by male animals is explained by assuming that it is a transformation product of the male hormone produced by dehydrogenation. Most of the oestrone excreted during pregnancy is extra-ovarian in origin and is probably elaborated by the placenta.

Two active substances have been isolated from the corpus luteum together with a physiologically inactive substance which is probably a reduction product of the luteal hormones.

Recent work on the anterior pituitary shows that this gland is the central point of the endocrine system and that growth and metabolism depend upon its proper functioning. It is essential for the normal behaviour of the thyroid gland, and it has been suggested that the condition produced in hypophysectomized dogs is only one of hypothyroidism. The anterior pituitary also exerts a hormonal influence on the parathyroids, but this factor has not yet been separated from the other hormones which the gland produces ; these include an adrenotropic factor and probably also a pancreatropic factor in addition to gonad-stimulating substances which differ, however, from the gonad-stimulating factors present in pregnancy urine. The anterior pituitary also possesses a lactogenic action which seems to be due to a protein called prolactin.

Crystalline insulin always contains zinc and is less active than impure insulin when injected intraperitoneally, but the reverse holds good when it is injected intravenously. Thyroxin increases blood fibrinogen and hastens blood clotting ; it also increases the fat content of the blood and muscles and decreases that of the liver. The primary cause of death following total ablation of the adrenal cortex remains undetermined, a decreased blood volume is produced and it is probable that the cortex maintains the water equilibrium between the blood and tissues. Indications have been obtained that the thymus hastens growth and increases the number and size of litters since acid extracts of the gland do this when injected into rats for several generations.—J. A. Nicholson.

Richter, J., & Gehring, K. (1935). Erfahrungen mit der hormonalen Graviditätsdiagnose bei der Stute. [**Hormonal Diagnosis of Pregnancy in Mares**]. —*Berl. tierärztl. Wschr.* **51.** 829-832. 1 table. [18 refs.]

Since oestrin and prolan regularly occur together in the blood of pregnant mares, the authors examined 105 blood samples in order to determine whether a combination of the Aschheim-Zondek test and the Allen-Doisy test would be an improved method for the diagnosis of pregnancy. In the first place, the mortality rate of the experimental mice was less when serum was used instead of urine, and the examination of the ovaries as well as of vaginal smears reduced the risk of experimental error which in this case was not greater than 4·3 per cent. The results showed that oestrin is present in the blood in recognizable amounts until the seventh week of pregnancy ; it then disappears but returns about the 150th day, disappearing again after the 200th day. Prolan is recognizable in the blood until the seventh to eighth week of pregnancy, but after this the Aschheim-Zondek test is unreliable. The authors conclude that no test can have an accuracy of 100 per cent. since, in addition to the other factors which influence the accuracy of the test, there are indications that at times oestrin and prolan temporarily appear in the blood of non-pregnant mares.—J. A. Nicholson.

Novotny, V. (1935). K studiu viskosity krve ssavců během brezosti, doby laktační a viskosity krve mlád'at. [**Viscosity of the Blood of Mammals during Pregnancy and Lactation and of the Blood of Young Animals**].—*Zverolék. Rozpravy.* **9.** 97-108 and 109-119. 3 charts. [15 refs.] [Abst. from French abst. in *Rev. vét. slave.* **2.** 62].

The author studied the viscosity of the blood of female rabbits and bitches during pregnancy, and that of new-born female rabbits. When the animals were bled it was noticed that the blood viscosity fell in rabbits during the first half of

pregnancy and in dogs up to the 52nd to 54th days of pregnancy. After that the viscosity increased, attaining a normal level in some of the rabbits, but not in the majority of cases.

After parturition, the viscosity increased especially in those animals whose blood had, during pregnancy, not attained a sufficiently high viscosity. The highest viscosity was in blood from animals that did not suckle their young. The viscosity of the blood of new-born animals is disproportionately high. It then falls until weaning, increases a little and attains a maximum at two months from birth. It then gradually falls until it reaches the normal limits of adult animals, where it remains with only slight variations.

NEWTON, O. M. (1934). Contribución al estudio de la calcemia en los bovinos. **[Blood Calcium of Cattle].**—*Rev. Med. vet., B. Aires.* **16.** No. 1. 12-24. 5 figs., 4 tables.

The author made an extensive study of calcium metabolism and its effect on animals of various ages and sex. He found Clark and Collip's method to be the best for his tests on the calcium content of the blood serum of cows, and gives full details of the technique. The average calcium content in samples of serum from 150 cows was 9·16 mg. per 100 c.c. The percentage was higher in pregnant than in non-pregnant cows, contrary to the calcium content in human beings.

EARLE, Imogene P. (1935). **Influence of the Ingestion of Colostrum on the Proteins of the Blood Sera of Young Foals, Kids, Lambs, and Pigs.**—*J. agric. Res.* **51.** 479-490. 4 tables. [19 refs.]

This paper gives data in regard to the changes which result from colostrum ingestion in the protein concentration and in the distribution of the protein fractions in the blood sera of young animals. Ten foals, three kids, six lambs and four pigs were used. Protein analyses were made of blood sera obtained from new-born animals immediately after delivery and of blood sera from the same animals at intervals after the ingestion of colostrum. Corresponding data was obtained from other animals which received in place of colostrum either milk of the same species, colostrum of another species, or a mixture of dried cow's milk and water. In most cases, protein analyses were also made of the colostrum which was ingested by each animal.

The author found that, in each of the four species examined, the euglobulin fraction of the serum proteins was either absent or present in very small amounts, while the pseudoglobulin I fraction was present only in very small quantities. In animals receiving colostrum there was a marked increase in euglobulin and pseudoglobulin I in the serum within 24 hours after birth. In those animals which received no colostrum there was little increase in serum globulins during the first 36 hours. In foals it was found that the greater the quantity of colostrum globulins ingested, the larger the accumulation of euglobulin and of pseudoglobulin I in the serum.—A. ROBERTSON.

GREENLEE, C. W. (1935). **Nutritional Studies.**—*Vet. Bull. U.S. Army.* **29.** 5-30.

This paper is a discourse on nutritional conditions ascribable to mineral deficiencies, avitaminoses and endocrine derangement affecting mineral fixation. It opens with a note on the necessity for recognizing as true pathological entities conditions which arise as a direct result of nutritional deficiencies. A description is then given of the normal physiological activities of the skeletal tissues and of the nutritional function of bone, with special reference to mineral deposition and resorption. A short account follows of present day views of the roles of vitamins

A, B, C, D and E and of the endocrine glands in animal nutrition. The remainder of the paper is a study of osteomalacia and rickets, which conditions the author regards as " symptomatic differences based upon age ". The paper ends with an account of the symptoms, diagnosis, prognosis and treatment of equine osteomalacia.
—C. DAVENPORT.

SEN, K. C. (1933-1935). **The Nutrition of Indian Cattle. Part I.—Some Nutritional Aspects of Cattle Breeding. Part II.—Malnutrition in Relation to Health and Production Capacity of Animals.**—*Agric. Live-Stk India.* **3.** 549-554 and **5.** 115-123. 11 figs. on 7 plates. [1 ref.]

I. The cattle requirements in India call for heavy milkers and animals for draught purposes. There is much evidence of mineral shortage. A half-bred Holstein gave 2,500 lb. of milk in each of her first two lactations. On subsequently giving her 4 oz. of bone flour daily, there was a yield of 4,000 lb. of milk in the third lactation period, and over 10,000 lb. in the fourth period. No control observations are given. Most of the good animals come from the tracts where rainfall is low. The provision of good pedigree bulls and the castration of scrub animals have greatly improved the breed, particularly in the Punjab.

II. The conditions of grazing in India are so bad that the majority of cattle are unthrifty and emaciated, mortality is high, sterility is common and productive capacity is low. Deficiency of lime and phosphorus seems to be the main cause, although in many parts of the country there is a protein shortage. In some quarters, the irrigation of the land by means of canals is increasing the mineral shortage. Claims are made for the prevention of Johne's disease by the administration of minerals to an infected herd, but sufficient details are not given.—HENRY DRYERRE.

URBÁNYI, L. (1934). Az állati szervezet mész-, foszfor- és D-vitamin-szükségletének megállapitása. [**Determination of the Calcium, Phosphorous and Vitamin D Requirements of the Animal Organism**].—*Allatorv. Közl.* **31.** 175-180. 3 tables.

This article gives some very clear practical information on the Ca, P and vitamin D requirements of growing and full-grown domestic animals, with particular reference to the fact that these requirements depend not only upon the stage of development, but also upon the manner of utilization of the animals. Tabulated data on the Ca and P content of various foodstuffs are recorded, and calculations made to show the amount of Ca or P supplement required in the case of rations low in Ca or P. Finally, indications for the supply of vitamin D are briefly mentioned.—A. KOTLÁN (BUDAPEST).

HARRIS, L. J. (1935). **Vitamins.**—*Ann. Rev. Biochem.* **4.** 331-382. 5 figs., 1 table. [Numerous refs.]

This review deals with the principal advances in knowledge of the vitamins and of their biological activity during the previous year. A new method of estimating B by use of the electro-cardiograph has been developed and evidence indicates that this vitamin is possibly concerned in carbohydrate metabolism. There has been further elaboration of the chemistry of the flavins, and lactoflavin has been shown not to be the anti-pellagra factor B_2, but the latter may be concerned with oxidation-reduction systems in the body. Blacktongue, a pellagra-like condition, has been experimentally induced in dogs and, owing to similar pathological manifestations and clinical symptoms, there is some evidence that B_2-deficiency may be related to pernicious anaemia. No further evidence is adduced for vitamins B_3 and B_4, and older methods of B_4-assay have been abandoned.

The titration of vitamin C with 2·6 dichlorophenolindophenol appears to be the best method of assay, and various organs of the animal body have been shown to have a comparatively high C content. A possible connexion between C-deficiency and rheumatic fever has been made, and the vitamin appears necessary for normal dental development. Experiments suggest the possibility of mannose as a precursor of vitamin C.

Surveys indicate in many parts of the world an incidence of hypovitaminosis A, characterized by definite skin lesions. Lack of the vitamin causes nervous degeneration, but the " anti-infective " nature of A has not been substantiated. Vitamin E may be an unsaturated cyclic ketone, whilst vitamin F (essential fatty acids) deficiency is associated with reproductive failure, in which gestation is characteristically prolonged, and with male sterility.—ALFRED EDEN.

FROHRING, W. O. (1935). **Vitamin A Requirements of Growing Puppies.**—*Proc. Soc. exp. Biol., N.Y.* **33.** 280-282. 1 chart. [5 refs.]

Thirty-one weaned puppies were freed from intestinal parasites and fed on a synthetic vitamin A-free diet. A minimum daily requirement of 200 U.S.P. vitamin A units per kg. body weight was needed to promote growth and live-weight increase, and no vitamin A was stored in the liver on this level of intake. Symptoms of vitamin A depletion include anorexia, xerophthalmia and general nervous irritability.—ALFRED EDEN.

TECHNIQUE.

SCHELLNER. (1935). Beschreibung einer Nasenrachensonde für die Entnahme von Schleimhautabstrichen bei Pferden. [**A Naso-Pharyngeal Sound for Horses**].—*Berl. tierärztl. Wschr.* **51.** 739. 1 fig.

An illustrated description of a nasal canula made of soft rubber through which is passed a wire carrying a swab at its end. The instrument is used for obtaining samples of pharyngeal mucus for bacteriological examination in investigations into such conditions as strangles.—J. E.

MISCELLANEOUS.

HÖBER, R. (1936). **Membrane Permeability to Solutes in its Relations to Cellular Physiology.**—*Physiol. Rev.* **16.** 52-102. 5 figs., 6 tables. [Numerous refs.]

In this article, the author deals at some length with the extensive field of physico-chemical studies on the permeability of inanimate membranes to solutes, and explores the extent to which the behaviour of these inanimate systems seems comparable to that of membranes evolved by nature in living cells. The properties of (1) sieve-like membranes ; (2) solvent-like membranes, and (3) surface films are described, and an attempt is made to point out briefly how far the comparison between inanimate systems and physiological objects has been successful.

Comparing the plasma membrane with a molecular sieve, *e.g.* with the dried collodion membrane, one cannot be satisfied in visualizing the membrane as a rigid layer pierced by channels, but must know the shape, the nature of its electric charge, the polar and non-polar adsorption affinities of the walls, the intimate structure of the double layer, and how to produce reversible changes of the pore diameters. Quantitatively, the permeability of artificial porous membranes seems far from being comparable to the physiological, because the permeation through

the dried collodion membrane proceeds with extreme slowness, while the needs of the living cells are satisfied only by a relatively speedy exchange across the plasma membrane. Undoubtedly this difference is primarily due to the thickness of the artificial membranes.

In considering solvent-like membranes, only a complicated mixture of different organic solvents, whose solvent power approaches a real chemical affinity, can be compared with the lipoids of the plasma membrane.

In surveying the oft-repeated discussion as to whether cellular phenomena can be pictured with greater success by the pore theory or by the solvent theory, the conclusion is reached that neither covers all the facts, but that the main difficulties of both might be harmonized in the mosaic theory ; this is the concept that at least two kinds of structural elements exist side by side at the surface of the cells which, as lipoid areas, can vary in their physico-chemical and chemical properties and, as porous areas, can vary in size and shape of the pores, and both of which can occupy the surface with different percentage of the total area.

It is difficult also to imitate plasma membranes with interfacial films, which are perhaps more comparable than any other models because of their thinness and reactivity. Thus, in spite of all refinements designed to make model membranes as nearly like their natural counterpart as possible, they still remain rather poor and inflexible imitations.

The article deals rather with physical chemistry than with the physiology of membranes. This method has been adopted to focus attention on the very stimulating studies on artificial membranes as models for the natural, and to point out promising lines for future research.—A. Robertson.

Quinlan, J., de Kock, G., & Marais, I. P. (1935). **The Operation of Splenectomy in Horses, Cattle, Sheep, Goats, Pigs, Dogs and Some South African Antelopes : A Summary of the Results of 98 Splenectomies.**—*Onderstepoort J. vet. Sci.* **5.** 273-303. 26 figs., 1 table. [8 refs.]

A description of the technique employed for the operation of splenectomy in the various species of animal is given as well as the methods of anaesthesia used. Young animals in hard condition should be chosen for operation. In three of the four horses splenectomized, a fatal relapse of nuttalliosis occurred. In cattle, relapses of anaplasmosis, piroplasmosis and *Theileria mutans* infection occur, usually of a severe type. Animals recovered from East Coast fever did not show any recurrence of the disease. As a result of splenectomizing sheep two parasites were found to appear, *i.e.*, *Anaplasma ovis* and *Th. recondita*, parasites not previously recorded in South African sheep. A splenectomized blesbuck (*Damaliocus albifrons*) was inoculated with heartwater and died from the disease. Splenectomy is a valuable means of rendering animals susceptible to certain protozoan diseases and of demonstrating whether they are carriers of infection.—E. M. Robinson.

Rimpau, W. (1935). Bakterien-Färbungen für Rot-Grün-Blinde. [**Bacterial Staining for those Suffering from Red-Green Colour-Blindness**].—*Münch. med. Wschr.* **82.** 1499-1500. [Copied *verbatim* from *Bull. Hyg., Lond.* **11.** 144-145. Signed J. C. Cruickshank].

A correspondent who, owing to colour-blindness is unable to use the usual Ziehl-Neelsen method of staining for acid-fast organisms with methylene-blue, picric acid or vesuvin as counterstains, is advised to try Berkas' modification of Hermann's stain.

i. Warm the preparation over the flame with ammonium carbonate-crystal

violet (3 drops 1 per cent. ammonium carbonate, 1 drop saturated alcoholic crystal-violet).

ii. Differentiate for a few seconds with 10 per cent. nitric acid followed by 95 per cent. alcohol.

iii. Counterstain with the following solution for 1 minute :–

Bismarck-brown	... ...	2 parts.
95 per cent. alcohol	...	60 ,,
Distilled water	... ...	40 ,,

iv. Wash in water. Dry.

As a counterstain in Gram's method where carbol-fuchsin is unsatisfactory, it is recommended to use Bismarck-brown, staining fairly deeply and using a stronger source of light.

OFFICIAL AND OTHER REPORTS.

DOMINION OF CANADA. (1935). **Report of the Veterinary Director General for the Year ending March 31, 1935.** [HILTON, G.] pp. 77. 43 tables. Ottawa : J. O. Patenaude, I.S.O. [8vo].

Reference is made to the situation in regard to foot and mouth disease in England and Scotland, the issuing of permits for cattle importation into Canada and the restrictions imposed.

Under an order to regulate the importation of veterinary biological products, and also their manufacture in Canada, no person can legally import or manufacture any veterinary biological product without a permit or licence issued by the Veterinary Director General.

Outbreaks of swine fever occurred in the Ottawa, Montreal, Toronto and Winnipeg districts, following the introduction of feeder pigs from the Winnipeg stock-yards.

Two outbreaks of rabies were suppressed without difficulty.

The importance of controlling bovine contagious abortion is stressed. Many breeders of dairy cattle now insist upon a satisfactory serological test or purchase only from negative herds. A plan for the certification of clean herds is being formulated.

Satisfactory progress is indicated in the campaign against bovine tuberculosis and the demand for this work continues to increase. It is proposed to give special recognition or creditation to areas in which the incidence of infection as indicated by the tuberculin test has been reduced to less than 0·2 per cent.

Brief mention is made of the general situation regarding contagious diseases, the meat inspection service, the major research problems and the extension of routine and diagnostic laboratory services.—C. A. MITCHELL.

DOMINION OF CANADA. (1935). **Pathological Division [Health of Animals Branch]. [Report].** [WATSON, E. A.]—*Rep. vet. Dir. gen. Dep. Agric. Can. 1935.* pp. 36-44. 2 tables.

The activities of the division are divided into three sections :– (1) the manufacture of diagnostic reagents and antisera (tuberculin, mallein, johnin, anti-distemper and anti-*abortus* sera) : tuberculin forms the major portion of these products, 1,459,993 test doses being issued during the year ; (2) diagnostic and analytical examinations : during the year 183,907 specimens were examined ; (3) research : research work was continued into tuberculosis – with special reference to antituberculosis vaccination by means of BCG – *Brucella abortus*

infection, distemper and encephalitis of foxes and other fur-bearing animals, and redwater of cattle.

The activities of two branch laboratories are also reviewed.—C. A. MITCHELL.

DOMINION OF CANADA. (1935). **Contagious Diseases Division [Health of Animals Branch]. [Report].** [CAMERON, A. E.]—*Rep. vet. Dir. gen. Dep. Agric. Can. 1935.* pp. 7-28. 21 tables.

ANTHRAX.—Two outbreaks were dealt with.

TUBERCULOSIS was dealt with under the Accredited Herd Plan, the Supervised Herd Plan and the Restricted Area Plan. Under one or other of these three plans, 26·5 per cent. of Canada's cattle population (2,251,771) are tested.

GLANDERS.—Two outbreaks occurred, involving the testing of 13,356 horses and the destruction of 128 reactors.

SWINE FEVER.—Outbreaks occurred in the provinces of Quebec, Ontario, Manitoba and Saskatchewan. Control measures necessitated the destruction of 5,091 pigs.

RABIES.—Three confirmed cases occurred among dogs. Immediate quarantine suppressed the disease.

MANGE.—Chorioptic mange was detected in cattle in Quebec, Ontario and Saskatchewan. Sarcoptic mange was dealt with on 30 premises in Alberta. Equine mange was discovered in the province of New Brunswick.—C. A. MITCHELL.

DOMINION OF CANADA. (1935). **Meat and Canned Foods Division [Health of Animals Branch]. [Report].** [BARNES, R.]—*Rep. vet. Dir. gen. Dep. Agric. Can. 1935.* pp. 29-35. 4 tables.

Seventy-five packing establishments are in operation under the Meat and Canned Foods Act. In these the following animals were slaughtered :– 1,350,370 cattle ; 858,136 sheep ; 2,862,125 swine ; 1,007 buffaloes ; 7 goats and 396,115 poultry. The carcasses of 17,731 cattle, 1,917 sheep and 9,911 swine were condemned. Mucoid degeneration, immaturity and tuberculosis accounted for 76·43 per cent. of the condemnations.

The regulations relating to the importation, manufacture, sale and use of veterinary biological products are quoted in full. Under these regulations, the manufacture or importation into Canada of veterinary biological products is permitted only by licence from the Veterinary Director General.—C. A. MITCHELL.

DOMINION OF CANADA. (1935). **Poultry Pathology Laboratory (Central Experimental Farm, Ottawa). [Health of Animals Branch]. [Report].** [WEAVER, C. H.]—*Rep. vet. Dir. gen. Agric. Can. 1935.* pp. 74-77. 2 tables.

1,729 routine specimens were examined and emphasis is laid upon the importance of parasitism. Approximately 16,000 samples of blood were serologically examined for the detection of *Salmonella pullorum* infection. Research investigations were undertaken on intestinal parasitic disorders, adult fowl mortality and diseases of chicks.—C. A. MITCHELL.

AUSTRALIA, SOUTH AUSTRALIA. (1935). **Report of Stock and Brands Department for the Year ending 30th June, 1934.** [LOXTON, C. A.] pp. 4. 4 tables. [fcp].

The incidence of contagious diseases during the past year has been satisfactory. Only 11 outbreaks of contagious bovine pleuro-pneumonia occurred, as compared with 35 in the previous year.

The Draught Stallions Act came into force this year: it provides for compulsory registration of all draught stallions, but only after they have passed an examination for soundness. The Brands Act, 1933, also came into force. New provisions in this act are the registration of sheep earmarks and firebrands.

An area is still quarantined for poultry on account of the presence of stickfast flea (*Echidnophaga gallinacea*).—W. I. B. BEVERIDGE.

NEW ZEALAND. (1935). **Report of the Chemistry Section.** [ASTON, B. C.]—*Rep. Dep. Agric. N.Z. 1934-35.* pp. 60-65.

Besides routine work on analysis of fertilizers, rich pastures, etc., the Chemical Section carried on investigations into certain problems of animal health.

" Bush sickness ", affecting a large area in the centre of the North Island, is now almost entirely controlled in sheep and cattle by the use of limonite licks. Sheep are breeding well, lambs fatten and wool is increasing in quantity by this general use of limonite. Limonite deposits have been investigated for their iron content and for traces of the rarer metals such as zinc or cobalt, the reason being that certain deposits of limonite are known to be useless for treatment of " bush sickness ".

Pampas grass was analysed and was advocated as a cattle fodder.

Sheep thyroid analysis for iodine was continued as a means of surveying for iodine content of South Island districts.—C. S. M. HOPKIRK.

INDIA, ASSAM. (1935). **Report of the Civil Veterinary Department for the Year 1934-35.** [SEN, G. P.] pp. 33 + 3. 17 tables. Shillong: Assam Govt. Press. [8vo] [8 annas] [9d.]

The establishment of the department consisted of one Superintendent, four Veterinary Inspectors and 56 Veterinary Assistant Surgeons reinforced by a newly appointed Veterinary Investigation Officer. There was a satisfactory increase in the number of contagious and non-contagious cases treated. The system of reporting outbreaks of disease has been changed and is being carefully watched. The virus-alone method of preventive inoculation against rinderpest is becoming popularized though it is still regarded as experimental. It is stated that additional staff is required to deal with the work. Legislative action to control cattle disease is forecast.

Investigation in regard to the incidence of Johne's disease has so far shown that it is confined to animals on the government breeding farms. A number of affected animals was given a diet of extra bone meal, with effective results.

It is suggested that " hump sore " in cattle in Assam is due to the presence of microfilariae and the matter is being further investigated.—G. K. WALKER.

INDIA, BRITISH BALUCHISTAN. (1934). **Annual Administration Report of the Civil Veterinary Department for the Year 1933-34.** [VACHA, N. K.] pp. 13. 9 tables. New Delhi: Govt. India Press. [8vo] [Re.1-4] [2s.]

The veterinary establishment consisted of one Deputy Superintendent in charge and 14 Veterinary Assistant Surgeons, of whom ten were in charge of dispensaries. There was an increase in the number of deaths from contagious disease over the previous year, mainly from rinderpest and blackleg. The number of cases treated at the veterinary dispensaries showed an increase of 1,260. There were ten stallions employed; they covered 422 mares against 355 in the previous year. It is stated that the Horse Show at Sibi was a great success. The work of the department is being increasingly appreciated by the public.—G. K. WALKER.

INDIA, BOMBAY PRESIDENCY. (1935). **Annual Administration Reports of the Civil Veterinary Department, including the Bombay Veterinary College; the Bombay City and Harbour Veterinary Department and the Civil Veterinary Department in Sind for the Year 1934-35.** [FARBROTHER, E. S.] pp. 49. 22 tables. Bombay: Govt. Central Press. [8vo] [As.3] [4d.]

Mr. Farbrother, the Director of Veterinary Services was in charge of the Presidency proper throughout the year, assisted by one Deputy Director, three Veterinary Inspectors and 119 Veterinary Assistant Surgeons. The Principal of the Veterinary College was in charge of the City and Harbour Veterinary Department in addition to his own work. The Province of Sind is under a separate Superintendent with one Veterinary Inspector and 22 Veterinary Assistant Surgeons. A Veterinary Investigation Officer is employed in the Presidency.

There were 93 students under tuition at the college at the end of the year, an increase of 20 over the previous year. A large number of specimens was received in the college laboratory for examination, and the final year students received practical instruction in laboratory methods.

In the Bombay districts there was an increase in the number of cases of contagious disease, mainly due to foot and mouth disease, which was wide-spread. In rinderpest outbreaks, anti-rinderpest serum was largely used, but it is stated that the value of goat virus as an alternative is being tested with a view to the more general adoption of the method for reasons of economy. Experiments were conducted to ascertain the viability of the virus in the spleen tissue of infected goats. The number of veterinary dispensaries remained static, but in some districts there was a demand for more.

The City and Harbour Veterinary Department deals with scheduled diseases in the City of Bombay and with the inspection of imported livestock. Five cases of surra and two cases of epizootic lymphangitis were detected. No cases of glanders were found. 2,371 horses were imported and those without valid certificates were tested with mallein. One case of glanders was discovered and destroyed.

In the Province of Sind the mortality from contagious disease was less than in the previous year. Sixty cases of surra were detected, of which a considerable number were cured with " naganol ". There was a notable increase in the amount of work performed on tour by the subordinate staff. Nineteen veterinary dispensaries continued in being with satisfactory results.—G. K. WALKER.

INDIA, PUNJAB. (1935). **Annual Report of the Civil Veterinary Department For the Year 1933-34.** [QUIRKE, T. F.] pp. iii + 5 + 35 + xx. 3 plates, 22 tables. Lahore: Supt. Govt. Printing. [8vo] [Re.1-6] [2s. 2d.]

The veterinary staff consists of the Director, five Superintendents, three Assistant Superintendents, 13 Deputy Superintendents and 356 members of the subordinate staff employed in the district and at the Government Cattle Farm whilst, in addition, 12 officers are employed at the Veterinary College. This is the largest staff employed in an Indian province.

An interesting feature of the report is the prominence given to the extensive work in connexion with animal husbandry which, in the Punjab, is controlled by the Civil Veterinary Department. Interesting progress in many directions is reported and the Government review discusses the work very fully.

The Hissar cattle farm carried 8,501 head of stock at the close of the year; 906 were issued for breeding purposes, and 56 were supplied for other purposes. Attention is given to milk recording, with a view to increased production, and investigation work in various other problems of interest is being conducted. There are six proprietary farms under government supervision, regarding which interesting

activities are reported. In the districts, various schemes designed to improve the breeding of cattle, buffaloes, camels, horses, donkeys, sheep and goats are in being, and progress is reported in every direction.

The year was an unhealthy one and there was a considerable increase in the mortality from contagious disease. Rinderpest was the most serious disease, closely followed by haemorrhagic septicaemia. Surra was severe and 6,541 cases were treated at 39 centres. The department has made great headway in this direction, the efficacy of treatment being well recognized by the public. Experiments are being carried out to determine the protective value of " naganol " apart from its curative value.

Preventive inoculation was widely carried out, mainly against rinderpest, haemorrhagic septicaemia and blackleg.

There were 294 veterinary hospitals which were very popular, as shown by the increasing number of admissions. Castrations increased from 226,445 to 245,490.

There were 64 students at the Punjab Veterinary College at the close of the year under report. The average daily attendance of patients was 191·6 ; this provided excellent clinical practice for the students. The routine diagnostic work in the various laboratories was heavy, 272 *post-mortem* examinations being conducted in the pathological section.

Research work was carried out on " granulomatous dermatitis " of buffaloes, canine fevers, rabies and a disease of horses, identified as equine encephalomyelitis [see this *Bull.* **5.** 17].

Progress is also reported in testing out the relative value of blood virus vaccine and spleen tissue vaccine for dealing with rinderpest. As a result of experience, it was found that cases of surra in the early stages could be successfully treated with a large single dose of " naganol ". A staff journal, the *Punjab Veterinary Journal*, published in Urdu, is maintained at the college and a number of publications were issued during the year.—G. K. WALKER.

INDIA, UNITED PROVINCES. (1935). **Annual Report on the Civil Veterinary Department for the Year 1934-35.** [EGAN, T. J.] pp. vii + 23. 10 tables. Allahabad : Supt. Printing and Stationery. [8vo] [Re.1].

The staff consists of the Director, three Circle Superintendents, one Veterinary Investigation Officer, 17 Veterinary Inspectors, one Veterinary Overseer and 211 Veterinary Assistant Surgeons.

Cattle disease was less severe than in the previous year, but foot and mouth disease was wide-spread. No case of anthrax was reported in equines and comparatively few in bovines. Rinderpest inoculation comprised four methods and the relative value of each method is being observed. The hope is expressed that it will be found possible to supersede the " serum-alone " by the " virus-alone " method. A number of cases of surra in equines was treated at special centres. It is reported that treatment was not always successful in advanced cases, pointing to the necessity for early diagnosis.

There were 173 veterinary hospitals and dispensaries and three more were added during the year. There was a satisfactory increase in the number of patients treated in these institutions and by veterinary assistant surgeons on tour.

The Veterinary Investigation Officer was mainly employed in the control of rinderpest by the use of blood and tissue antigen. The preparation of tissue vaccine has been started at the Central Laboratory, Lucknow, under his supervision. Diagnostic work at the three laboratories established in the province

increased. Experimental treatment to test the value of colloidal iodine as a poultry anthelmintic was begun.

There were 56 horse stallions and nine donkey stallions at work at the end of the year.—G. K. WALKER.

CALCUTTA (INDIA). (1935). **Annual Report of the Calcutta School of Tropical Medicine and the Carmichael Hospital for Tropical Diseases 1934.** [ACTON, H. W.] pp. 182. 4 plates, 37 tables, 4 charts. Alipore: Bengal Govt. Press. [8vo].

This report contains the following points of veterinary interest :–

BRUCELLA INFECTION.—Repeated blood agglutination tests were carried out on a goat suspected of having been the source of undulant fever in a child. A positive reaction to *Br. melitensis* (titre 1 : 125) was obtained, but the organism could not be isolated from the blood.

COCCIDIA OF INDIAN CATS.—Microscopic examination of oocysts from the faeces of cats gave evidence of only two species, *Isospora bigemina* and *I. rivolta*. The writer is of the opinion that *I. felis* is synonymous with the latter.

RABIES.—Rabies was diagnosed in 22 dogs at the Pasteur Institute at Calcutta. —J. E.

SOUTHERN RHODESIA. (1935). **Report of the Chief Veterinary Surgeon For the Year 1934.** [HOOPER SHARPE, G. C.] pp. 13. Salisbury: Rhodesian Printing & Publishing Company. [fcp].

The staff numbered 13 veterinary officers and 46 cattle inspectors at the end of the year. Mr. J. M. SINCLAIR vacated the post of Chief Veterinary Surgeon on retirement and was succeeded by Mr. G. C. HOOPER SHARPE.

The year was a bad one for stock, owing to scarcity of vegetation due to drought and locust invasion.

BOVINE TUBERCULOSIS was only observed in two animals. All cattle have to pass the tuberculin test before being imported into the country.

EAST COAST FEVER.—A detailed history of the disease is given. It caused considerable anxiety, but was under control by the end of the year.

FOOT AND MOUTH DISEASE also gave trouble and was still present in four separate areas at the end of the period under review. Outbreaks are controlled by a standstill order, the creation of a three mile wide cattle-free belt around the infected area and the use of virus [no details] on all infected and in-contact animals. After a quarantine period the cattle are dipped and released. [See, however, LAWRENCE – p. 508. – according to whom the belt was later made five to 20 miles wide].

The origin of the 1934 outbreak has not been discovered ; it evidently was not carried over from the previous outbreak of 1931, as the types of virus were different.

HEARTWATER appeared to be spreading from low veldt to higher ground due to the dissemination of the bont tick (*Amblyomma hebraeum*), the vector.

HORSE-SICKNESS.—No cases were reported.

Short notes are given on other diseases of only minor importance.—J. E.

SOUTHERN RHODESIA. (1935). **Report of the Director of Veterinary Research for the Year 1934.** [LAWRENCE, D. A.] pp. 10. Salisbury: Rhodesian Printing & Publishing Co. Ltd. [fcp].

The technical staff was limited to two British veterinary officers, but a few

officers from the Chief Veterinary Surgeon's department assisted in research work for a few months.

ROUTINE WORK.—Over 5,000 blood slides were sent for diagnosis, the principal findings being 542 cases of *Theileria mutans* infection, 124 of gall-sickness [anaplasmosis], 101 of redwater [piroplasmosis] and 78 of trypanosomiasis.

Ninety-eight out of 681 blood samples were positive to the agglutination test for *Brucella abortus*, and 1,565 doses of anti-abortion vaccine were issued, but the use of the vaccine is declining, as control by blood testing and clean herd building is preferable.

A vaccine against blackleg was prepared and used on a large scale in Northern and Southern Rhodesia. Strains of *Babesia bigemina* and *Anaplasma marginale* were issued for the immunization of young calves against redwater and gall-sickness. A new neurotropic vaccine against horse-sickness was supplied by the Onderstepoort laboratory, which superseded the Rhodesian vaccine formerly in use. The outlook is now very favourable.

RESEARCH.—Owing to the risk of mortality from the use of *A. marginale* for immunization against gall-sickness, *A. centrale* is under trial.

A special research farm at the edge of a tsetse fly area was used in order to find out whether cattle and working buffaloes could be kept healthy by varied forms of feeding, management and chemotherapy. Preliminary results indicated that trypanosomiasis could be kept in check by such a combined plan.

After 18 months' absence foot and mouth disease reappeared at a ranch in July. The research staff had to prepare virus for the nasal inoculation of in-contact animals. Vesicle fluid was collected from affected animals, injected into the tongues of healthy animals and virulent blood, obtained from them 48 to 72 hours later, was collected into glycerin-citrate saline solution : small quantities of vesicle fluid were added to increase the infectivity.

It became evident that the type of virus in this new outbreak was different from that present in 1931, as animals affected during the previous epidemic again contracted the disease. Virus was in consequence sent to England to be typed, but its identity had not been settled at the time of writing this report. Particulars are also given of the pathogenicity for guinea pigs of virus from the new outbreak and its viability when allowed to dry on leaves of plants.

A new, undiagnosed disease of cattle of the area in which foot and mouth disease existed (Nuanetsi ranch) was being investigated. Animals brought in from other parts became ill rather suddenly after being on the strictly demarcated affected area for three weeks and some died after a matter of hours ; others hung on for several weeks, depending mainly upon the extent to which they exerted themselves, it being usually possible to cause death by merely driving the sick beast about for a short time so that it became dyspnoeic.

" An affected mob of cattle is readily recognisable by the large number of animals in low condition and showing marked enlargement of the lymphglands. On examination of a fresh case of the disease it is found that the temperature is elevated, frequently up to 106-107°F. A discharge from the nose is a common but not constant symptom. In a number of cases lesions simulating those of ophthalmia are also present. The superficial lymphglands are frequently, but not always markedly enlarged. Respiration is accelerated, in fact often dyspnoeic. Sometimes the animals are dull and disinclined to move, and in such cases a detailed examination, including the preparation of blood and gland smears is possible without having the animal controlled. In other cases, marked aggressiveness is displayed. Diarrhoea is frequently observed, especially in those cases which survive for a few days. . . ."

" *Post-mortem Lesions.*—As is to be expected from the variable course of the disease, these depend on the time the animal has been sick. In cases of the sub-acute or chronic form of the disease emaciation is pronounced. In acute cases the condition may be excellent.

A small percentage is found with froth exuding from the nostrils. Signs of galloping movements having preceded death are commonly observed. Typical lesions, as judged by the majority of cases, are as follows: Ascites, hydrothorax, hydropericardium, congestion of lungs and kidneys, tumor splenis, lymphoid hyperplasia, abomasitis, which is frequently even haemorrhagic, and a variable degree of enteritis. In a small number of cases, especially where the disease has existed for some time, extensive oedema of the pectoral region is encountered, and corneal opacity is a fairly common finding."

Examination of the blood and lymph glands for protozoan parasites has been negative and the kidney, liver and heart have appeared normal on histological examination.

Attempts to transmit the disease by blood or gland inoculation into healthy cattle outside the affected area were unsuccessful. The part played by ticks is being investigated.—J. E.

COLONY AND PROTECTORATE OF NIGERIA. (1935). **Annual Report of the Veterinary Pathologist.** [HENDERSON, W. W.]—*Rep. vet. Dep. N. Nigeria, 1934.* pp. 22-31. 2 tables.

Owing to the Assistant Pathologist being seconded to the Medical Department until the end of the year and the Veterinary Research Officer being employed at Kano on investigation of the effect of skin diseases of goats on the market value of skins, there were only two European laboratory assistants available at the laboratory for the whole routine work of producing vaccines and serum.

The biological products manufactured were 12,983·5 litres of anti-rinderpest serum, 83,433 doses of formolized rinderpest spleen vaccine, 350,725 doses of formolized blackleg vaccine, 147,900 doses of bovine contagious pleuro-pneumonia culture, 23,930 doses of haemorrhagic septicaemia vaccine and 700 doses of haemorrhagic septicaemia aggressin.

Investigations carried out included those on the government farms to ascertain the cause of excessive mortality in calves. Bad hygienic methods were found to be the main cause. White scour, navel ill, and a bacterial enteritis with pulmonary complications were chiefly responsible for the deaths on one farm; coccidiosis was found to be common on the other. Attention to hygiene reduced the mortality on both farms among these hand-fed animals.

The addition of rinderpest virulent spleen pulp to the immunizing injections was found to increase the potency of anti-rinderpest serum obtained from animals so treated at the time of immunization with rinderpest virulent blood, but it was found practically impossible to avoid abscess formation.

The passage of rinderpest virus through Nigerian goats had no effect on the virulence of the blood up to the 85th passage. This result differs from those obtained in China, where passage of rinderpest virus through goats is said to reduce its virulence.

Experiments were carried out on the production of a saponin anthrax vaccine, consisting of a virulent suspension of anthrax organisms with 1 per cent. of added saponin; inoculations were made on the under surface of the tail and immunity was produced in ten days. This vaccine has been used extensively in the field with excellent results.

" Heartwater ", known locally as " kaboa ", was found among calves.

Anaplasmosis was definitely diagnosed as being a cause of anaemia in cattle, but it does not lead to mortality in Nigeria.

Anti-rabies vaccine is now being produced and is being used extensively for the protection of dogs.

Methods for the microscopic diagnosis of rabies are described.—J. A. G.

PALESTINE. (1934). **Report of the Veterinary Laboratory 1.4.33 to 31.3.34.** [GILBERT, S. J.]—*Rep. Dep. Agric. Palestine, 1934.* pp. 61-65. 1 table.

Routine diagnosis increased to such an extent that the staff and accommodation available were hardly adequate. Over 24,000 specimens and two thousand slides were examined. Blackleg vaccine and serum and fowl cholera serum were additions during the year to the laboratory products issued.

BOVINE MASTITIS.—Sixty-eight samples of milk were examined and streptococci were found in 12 instances.

ANTHRAX.—In addition to microscopic examination, Ascoli's reaction was frequently used for diagnosis. The precipitin test proved most satisfactory in the diagnosis of an outbreak of anthrax in hounds. Potency tests for the anti-anthrax serum were carried out on rabbits. The limited laboratory accommodation prevented the production of vaccine.

Brucella abortus INFECTION.—Nearly 20,000 agglutination tests were made. Herd testing was carried out under a government eradication scheme. *Vibrio foetus* was demonstrated in some cases. The agglutination test for brucella infection in fowls was also studied.

DOURINE.—2,485 tests were carried out, 3·46 per cent. of results being positive. The technique of the complement-fixation test was improved.

BOVINE COCCIDIOSIS.—This was diagnosed for the first time.

PLEURO-PNEUMONIA OF GOATS.—Some passage experiments were carried out.

FOWL TYPHOID.—Nine cases were demonstrated by cultural methods.

" CELL INCLUSION DISEASE " OF POULTRY.—Promising results were obtained with a vaccine.—F. H. MANLEY.

CITY OF LIVERPOOL (GREAT BRITAIN). (1935). **Report of the Chief Veterinary Officer for 1934.** [PILLERS, A. W. N.] pp. 33. 2 figs. on 2 plates, 10 tables. Liverpool : C. Tinling & Co., Ltd. [8vo].

The report sets forth the work of the Veterinary Department, which is in charge of the City Corporation Stud of 246 horses and also of a general farm.

Within the city are 3,440 cows in milk, which produce one-fourth of Liverpool's milk supply ; these cows were inspected " approximately twice ". Of milk produced within the city, 22 out of 541 bulk samples taken were found to contain tubercle bacilli, the corresponding figures for milk produced outside being 841 and 30.

The range of operations under the Diseases of Animals Acts is clearly detailed. No case of anthrax, glanders or parasitic mange was observed. Three in-contacts of outbreaks of foot and mouth disease passed through the City abattoir, but no fresh outbreak occurred. Only one case of swine fever occurred in the city.—J. E.

CITY OF MANCHESTER (GREAT BRITAIN). (1935). **Markets Department. Report of the Markets Committee for the Year ending 31st March, 1935.** pp. 26. 29 tables. Manchester : Henry Blacklock & Co., Ltd. [8vo].

This is the report of the Market Superintendent who deals with the work of the Veterinary Officer, much of the report covering activities that are not of a veterinary nature. The report of the work of veterinary interest done by the Committee's veterinary surgeon gives information on diseases found in slaughtered animals and on notifiable diseases of animals in the City of Manchester. Only five cases of tuberculosis [presumably in cattle] were observed. Five outbreaks of swine fever are recorded.

City and County of Newcastle upon Tyne (Great Britain). (1935). **Veterinary Department. Annual Report of the Veterinary Officer for the Year 1934.** [Parker, T.] pp. 27. 19 tables. Newcastle upon Tyne : R. Ward & Sons, Ltd. [8vo].

This report records that, during the year 1934, visits were made to premises in connexion with the Rats and Mice (Destruction) Act, 1919. In order to enable a trader within the city to comply with the regulations of the Italian Government, three consignments of wool were certified as originating from places and animals free from infection of sheep scab. 1,216 cattle, 4,612 sheep, 12,137 pigs and 24 horses arrived by sea from Aberdeen. 982 horses were slaughtered within the city for the purposes of exportation of the carcasses for consumption on the Continent. 242 vessels carrying meat and other foods from Denmark, Holland, America, Canada, Australia and Madagascar arrived at the quayside.

The number of cattle exhibited within the cattle market has been well maintained, the total of 40,521 being the highest for any one year during the past 17 years. 228,603 animals were slaughtered within the city for food purposes. The total number of beef carcasses condemned for tuberculosis in 1934 is the highest since 1920. For the purposes of the Transit of Animals Orders, 2,880 visits were made to the cattle markets, lairs and railway cattle docks.

[The items mentioned indicate, but by no means exhaust, the variety of information to be found in the report, and serve to illustrate the multifarious duties which form part of the sphere of action of the veterinary department of the city].

Diseases of Animals.—Five out of 523 dairy cows in the city were dealt with under the Tuberculosis Order of 1925. No case of foot and mouth disease or anthrax was observed and only one outbreak of swine fever occurred. A table is given showing the cases of tuberculosis and other diseases affecting milch cows in the city between 1907 and 1934.—E. Brown.

County Borough of Preston (Great Britain). (1935). **Report of Veterinary Inspection in Preston for 1934.**—*Rep. med. Offr Hlth Preston, 1934.* pp. 53-67. 6 tables.

The 441 cows in the borough were inspected at least twice during the year. Thirty-eight samples of milk produced outside, but sold inside, Preston were found to contain tubercle bacilli and, during subsequent examination of the corresponding dairy herds by the County Veterinary Department, 24 cases of tuberculosis were found, of which 13 involved the udder.

Information was also given on meat inspection.

One case of anthrax, four of bovine tuberculosis, one of mange and one of swine fever were diagnosed.—J. E.

Great Britain. (1935). **British Empire Cancer Campaign. Twelfth Annual Report of the Grand Council Presented at the Meeting Held at the House of Lords 25-11-35.** [Edited by Lockart-Mummery, J. P.] pp. xxxi+247. 7 figs., numerous tables, 4 charts. [Numerous refs.] London : British Empire Cancer Campaign. [4to].

A most exhaustive report on progress in research and treatment of cancer. The Chairman of the Grand Council, the late Lord Reading, first gives a short précis of new knowledge acquired during the year ; this is followed by several reports of research institutes, hospitals and individual research workers, all subsidized by the funds of the campaign.

The Rous sarcoma of fowls and the Shope papilloma of rabbits have been much used in the study of the nature of the causal agent. By the aid of ultra-high speed centrifugation, the causal agent of the former has been found to be of a particulate nature, presumably virus particles or elementary bodies.—J. E.

—. (1935). **Report of the Special Committee on Fur-Bearing Animals, Etc. Presented to the Council of the National Veterinary Medical Association on July 2nd, 1935.**—*Vet. J.* **91.** 500-502.

This is a report on the economic value of fur-bearing animals, pigeons and aviary birds in this country. Certain recommendations are also made with the object of bringing about the collaboration of the veterinary profession and the owners of such stock.—F. Blakemore.

Philippine Islands. (1934). **Fourth Annual Report of the Director of Animal Industry for the Fiscal Year ending December 31, 1933.** [Buencamino, V.] —*Philipp. J. anim. Indust.* **1.** 215-249, 303-331 and 429-522. 7 figs. on 4 plates, 63 tables.

A brief general review is followed by the four detailed divisional reports. Dr Buencamino was appointed Director of the Bureau of Animal Industry at the beginning of the year and Dr San Agustin Assistant Director and Dean of the College of Veterinary Science at Manila. Other changes in the staff are also given (p. 445.) The whole department cost approximately 400,000 Philippine dollars for the year, which was considerably less than for 1932.

Animal Diseases Control Division.—Rinderpest did not cause great loss, only 529 cases with 297 deaths being observed. It remains localized to sparsely populated districts where cattle are congregated on common pastures.

Foot and mouth disease occurred in 26,000 animals and caused 346 deaths, a large increase over 1932. The cases were, however, generally of a very benign character. Haemorrhagic septicaemia caused the death of 763 carabaos (water-buffaloes) and 26 cattle, and 223 carabaos and six cattle died of anthrax. Vaccination is used against both diseases. A few cases of tuberculosis were observed in cattle and swine. Ninety-four horses, 15 carabaos and one bovine died of surra. Glanders broke out in army mules.

Information is also given on the importation of livestock and meat and on the abattoir services.

Animal Husbandry Division.—A report is given of the various improvement schemes in operation, of several government stock farms and of work on several grasses to test their nutritive properties.

Animal Production Division.—This division only came into existence in July, 1933 : it is engaged on investigating methods for utilizing the carcasses of slaughter animals to the best advantage.

Veterinary Research Division.—Four veterinarians were engaged in research. Two types of experimental rinderpest vaccine (liquid and dry) were produced, and are still being investigated. The division undertakes the diagnosis of foot and mouth disease ; there is difficulty in transmitting the local strains to laboratory animals. Fowl plague virus was successfully cultivated in tissue culture and its use as a vaccine is being investigated. A dry tissue vaccine and a bone-marrow vaccine against swine fever are being studied. Work was done on a rabies vaccine, pigeon, fowl and turkey pox vaccines, tuberculosis, fowl cholera and *Salmonella pullorum* infection. Evidence was obtained of *Brucella abortus* infection in swine.

A list is given of parasitic worms under study. With regard to surra it was " definitely established that mechanical transmission by the Tabanus flies may be after all the most important factor in surra transmission ". The complement-fixation and mercuric chloride tests for surra were also investigated : they are both said to be of value.

The report is followed by 60 pages of statistical tables covering all aspects of the work of the Bureau of Animal Industry.—J. E.

DA ROCHA LIMA, H. (1934). Instituto biologico. [**Biological Institute, São Paulo**].—*Arch. Inst. biol. Def. agric. anim. S. Paulo.* **5.** 5-24. 3 figs.

This institute was founded in 1928 and is maintained by the State of São Paulo, under the Ministry of Agriculture, to undertake investigations into infectious diseases of animals and the preparation of sera and vaccines. Dr. H. da Rocha Lima is the director of the institute. The Animal Diseases Division comprises seven departments – Zoology, Physiology, Anatomy, Microbiology, Immunology, General Epizootics and Diseases of Birds. There is also a branch dealing with diseases and parasites of plants.

Special post-graduate courses are held for veterinarians. There is a library taking about 500 journals yearly and a photographic department. A list is given of the scientific publications written by the staff between 1928 and 1934.

The new institute is nearly completed. All departments will then be in the same building, which will facilitate the work considerably. A plan is given of the arrangements of the paddocks and sheds on the new estate.

ALTARA, I. (1934). Relazione sull'attivita svolta dall' Istituto nell'anno 1933. [**Report of the Istituto Zooprofilattico Sperimentale, Turin, for 1933**].—*Boll. Ist. Zooprofil. Sper., Turin.* March. pp. 6-20. 2 tables.

In 1933 the number of cases dealt with was 5,791 compared with 280 in 1928. They included diseases of swine, cattle, sheep, goats, horses, rabbits, hares, fish and poultry. The institute has a special department for the last named.

The major problems studied during the year included an outbreak of gangrenous coryza in cattle. The condition was enzootic in character and in some herds 50 per cent. of the animals were affected. The cause was found to be an ultra-visible virus transmitted by sheep kept in the same sheds as the cattle.

Live vaccine was successfully employed in controlling an outbreak of epizootic abortion which spread with exceptional rapidity in Piedmont. The connexion between brucella infection in animals and undulant fever in man was also investigated.—NORMAN BISSET.

BOOK REVIEWS.

HARVEY, W. C. [M.D., D.P.H., M.R.San.I., Medical Officer of Health, Borough of Southgate], & HILL, H. [M.R.San.I., A.M.I.S.E., M.S.I.A. " Ollett " Gold Medallist 1932 ; Sanitary Inspector, Borough of Southgate]. (1936). **Milk Production and Control.** pp. viii + 555. 180 figs., 32 tables. [Numerous refs.] London : H. K. Lewis & Co., Ltd. [8vo] [21s.]

The authors state in their preface that they have endeavoured to present the question of milk production and control as these matters now stand, in so far as they affect each section of the community from the farmer to the consumer. To this end the following subjects are discussed :– Composition of Milk ; Milk and Disease ; The Cow and the Cowshed ; The Dairy ; Clean Milk Production ;

The Distribution of Milk; Designated Milks; Treatment of Milk by Heat; Laboratory and Other Control; Legislative Control, and Future of the Milk Industry.

In attempting to write a book to be of interest and of assistance to all those concerned with the milk supply as well as to the consumer, the authors have undertaken a task which could hardly be achieved in a single volume, and omission of necessary detail has been the inevitable result. Consequently a book has been produced which should be of great value and interest to the intelligent consumer desirous of superficial general knowledge regarding the production and marketing of milk. It may also serve to enlighten those concerned with milk production on such sections of the processing with which they are unfamiliar. In no section, however, has sufficient detail been incorporated to be of real assistance to the specialist in his own particular branch.

The book contains a number of statements which the reviewer would question, for instance " it is probable that the incidence of the disease " (bovine contagious abortion) " in dairy cattle is no higher than is the case with tuberculosis ". Also the authors have been unfortunate in the time of publication, as it was obviously not possible for them to explain fully the new regulations regarding the grading of milks, neither could they have had the advantage of the recent Medical Research Council Report dealing with the same subject.—E. J. PULLINGER.

MIESSNER, H. [Dr. med. h.c., med.vet.h.c., phil. et med. vet. o. Professor für Hygiene, Seuchenlehre und Veterinärpolizei. Direktor des Hygienischen Instituts der Tierärztlichen Hochschule in Hannover], & SCHOOP, G. [Dr. med. vet., Privatdozent für Bakteriologie und Hygiene, Oberassistent am Hygienischen Institut der Tierärztlichen Hochschule in Hannover]. (1935). Veterinärhygiene mit Anleitung für die hygienischen Uebungen. Leitfaden für beamtete und praktische Tierärzte, sowie für Studierende der Veterinärmedizin. [**Practical Veterinary Hygiene. A Guide for Veterinary Practitioners and Students**]. pp. viii + 190. 87 figs. Hanover: M. & H. Schaper. [8vo] [RM. 11.50].

This book covers the ground of 15 two-hour periods of instruction in general veterinary hygiene from the practical aspect. It describes numerous methods of investigating hygienic conditions (examination of water and air for impurities and so on) and gives the necessary fundamental information in a condensed form.

The matters dealt with are air, earth, including pathogenic organisms and parasites found in it, water, construction of stalls, stables, sties, sheds, etc., for domestic animals, pasturage, disinfection and food-stuffs, including injurious constituents which may occur therein.

In view of the fact that this book only covers practical instruction, some omissions and lack of detail are of no consequence, it being assumed that theoretical instruction supplied the deficiency.

It is interesting to note the different ways in which hygienic problems are dealt with in different countries. This is evident on reading corresponding books of English and American origin. The recommended Grabner neck chain for securing cows is an illustration of this: it is much simpler than the American yoke and equally efficient.

Roof illumination (windows) seems to be making very slow progress in Germany, if this book is any indication, as there is no mention of roof lights.

The printing and illustrations of the book are quite good and the contents list and index are well arranged.—J. E.